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Faculty of Science

IMPACT OF URBANISATION ON VEGETABLE CULTIVATION AND SUPPLY FOR *THE TRADITIONAL MARKETS IN ZAMBIA. A CASE STUDY OF SELECTED* MARKETS IN LUSAKA DISTRICT.

NAME: JOHN NYAWALI

STUDENT NUMBER: NYWJOH002

COURSE: MPhil ESS

SUPERVISOR: DR. JANE BATTERSBY

Email: nywjoh002@myuct.ca.za/ nyawalij@gmail.com

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DECLARATION

I wish to declare that this research is original work based on the actual study conducted in the selected places of interest. The research was conducted based on the faculty ethics guidelines and that respondents were guaranteed confidentiality, anonimity and permission was sought from respondents before information was gathered for this reseach.

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LIST OF ACRONYMS

CRFS	CITY-REGION FOOD SYSTEMS
CSO	CENTRAL STATISTICAL OFFICE
DACO	DISTRICT AGRICULTURE CORDINATING OFFICE
FAO	FOOD AGRICULTURE ORGANISATION
JICA	JAPAN INTERNATIONAL CORPORATION AGENCY
LCC	LUSAKA CITY COUNCIL
MACO	MINISTRY OF AGRICULTURE AND CO-OPERATIVES
MLGH	MINISTRY OF LOCAL GOVERNMENT AND HOUSING
SAO	SENIOR AGRICULTURE OFFICER
SP	SENIOR PLANNER
SSA	SUB- SAHARAN AFRICA
UA	URBAN AGRICULTURE
UCS	URBAN CONSUMPTION SURVEY
UFS	URBAN FOOD SECURITY
UN III	UNITED NATION HABITAT
WHO	WORLD HEALTH ORGANISATION

ABSTRACT

The increase in urban population has brought with it challenges that have threatened the sustainability of urban food security as less attention has been paid to aspects of food security in planning processes.

However, in recent years, some International organisations and consortiums of city governors from across the world have pointed out the need to understand how urbanisation and increasing city's population were affecting food security for urban residents. Urbanisation is one of the 21st century's most transformative trend as it is envisioned that the world urban population will double by 2050, hence, the need for sustainable urban food systems.

The aim of this study therefore was to identify sources of key vegetables (Rape, Onion, Tomatoes, and Cabbages) supplied to the traditional markets in Lusaka as well as endeavour to understand the extent to which urbanisation had affected the production and supply of vegetables in Lusaka.

This research revealed that urbanisation had caused loss of urban agriculture land in many parts of the city that were previously zoned as agricultural areas, consequently causing changing patterns of vegetable procurement and supply.

It was discovered that Lusaka heavily depended on regional food networks for its vegetable supplies as 73% of the vegetables under study were sourced from outside Lusaka while 27% were produced within the administrative boundaries of the city, particularly those classified as peri-urban areas.

Despite the city relying on regional food systems, there was lack of clear policy by the local authority to promote urban food security including lack of adequate storage and transportation infrastructure that would sustain food security in an event of disruption due to environmental and climatic challenges.

Additionally, this study showed that planning for urban food security was not prioritised by local authority as food governance was done on an ad hoc basis and inundated by political interference and limited trading spaces which were mostly a source of conflict between market managers and vegetable farmers.

Generally, the study found that governance challenges at Soweto market were negatively affecting urban food security as they inhibited accessibility, affordability and availability of vegetables for urban consumers, especially low income consumers who depended on traditional markets for their vegetable supply.

1.0 Introduction

With the world urban city population expected to double by 2050 from the estimated one billion people that were living in cities across the world (UN Habitat,2016), causing challenges to sustainable urban food security, there has been growing interest to study and plan how cities will respond to this phenomenon. Among the growing interest are urban food security and food systems, considering that urbanisation does not only affect service provision to urban settlers but that it also leads to conversion of urban agricultural land to other uses, therefore, changing ways on how cities are fed.

The conversion of urban agricultural land into other urban land uses, in the urbanisation, process has become a serious issue for sustainable development world over as major cities across the world are coming up with initiatives on how to feed the increasing population in cities in the wake of decreasing urban agricultural land. Urban expansion entails transformation of large amounts of urban agricultural land into other land uses particularly real estate and construction sectors.

With the anticipated increase in the world's population, especially in many cities across the world, studies of urbanisation and urban agricultural land have drawn a lot of interest and debate about city and regional city food systems both in the developed and developing world.

Ramankutty (2015) notes that the importance of urban agriculture and food security has grown as a research and policy issue on the international and local development level because of its contribution to food and nutrition security, livelihood and income generation, and eradication of poverty among urban residents involved in urban agriculture.

International agencies such as FAO (1999) and several authors Koc et.al (1999) Smith (2010) and Mougeot (2011) have conducted research in different parts of the world on the linkages between urban agriculture and urbanisation in respect of their benefits and disadvantages.

Further, the United Nation's Habitat New Urban Agenda, popularly known as the Quito Declaration on sustainable cities and human settlements, also points out the need for sustainable urban food systems as it envisions that the population in many urban cities across the world will nearly double by 2050 from the current estimated one billion people living in different cities, hence, making urbanisation one of the 21st century's most transformative trend (UN Habitat, 2016).

This interest is further shared by other global consortiums such as the Milan Urban Food Policy Pact (2015), which was a Pact signed by 138 cities across the world in the year 2015 aimed at developing sustainable food systems that are resilient, safe and diverse while the Seoul Declaration (2015) for Sustainable Cities also aims at understanding and generating knowledge on sustainable urbanisation and the food systems.

At the continental level, urban food system studies concerning urban agriculture, particularly of vegetable production and supply have been conducted in countries such as Tanzania (Wegerif,2014, Jacobi et.al 2000 and Masashua et.al 2009) Ghana and Burkina-Fa-so (Karg et.al 20160). Battersby (2014) also highlighted the need for diversified food sources for the African cities to make them food secure and resilient to increased population including extreme weather events.

Karg et.al (2016) notes that urbanisation has affected urban food supply and urban food systems as such, shorter food supply chains and more localised food systems at the city or community level were advocated for because of their perceived inherent benefits.

When it comes to the Zambian context particularly Lusaka, however, the concern is that most of the international declarations and documents like City Region Food System Situation Analysis of Lusaka (FAO,216) assume that there is a local food system feeding the city as there are farms or peri-urban agricultural activities outside Lusaka city. The second concern is that lack of planning for urban agricultural land as highlighted in the City Master plan (MLGH,LCC & JICA, 2009) or lack of its emphasis thereof in this document might lead to loss of planning for agricultural land within the city as urban agriculture might not get much attention.

1.1 Statement of the problem

Like many urbanising cities of the South, Lusaka's population increase has resulted in pressure to convert previous urban agricultural land to housing projects and shopping malls to handle the needs of this population. This scenario is likely to result in decreased urban agriculture land and increased demand for food.

Despite increased research interest by academics and international organisations in urban food supply and production, there is lack of studies that analyse the actual proportions and significance of local vegetable supply to the urban markets in Zambia, particularly Lusaka.

Other studies conducted in Lusaka (Hampwaye et.al, FAO, 2016 Sanyal, 1987, Agyemang et al, 1997, Lubinda, 2000; Hampwaye et.al, 2013) have focused on urban agriculture as a source of household income, household food security and environmental impacts of such an activity. No studies have been conducted to ascertain the impact of urbanisation on urban agricultural land particularly the cultivation of vegetables taking into account that Lusaka has not lagged behind in the process of urbanisation.

1.2 Aim

The aim of this study, therefore, was to identify the current sources of key vegetables (Rape, Onion, Tomatoes, and Cabbages) supplied to the traditional markets in Lusaka.

The research also endeavoured to understand the extent to which urbanisation had affected the production and supply of vegetables in Lusaka.

1.3 Objectives of the study

1. To identify sources of vegetables for the traditional markets (Soweto and Chainda markets) in Lusaka;
2. To understand the accessibility and processes of vegetable procurement for market supply; and
3. To assess whether and why the trends of vegetable sourcing for the urban market had changed.

1.4 General **Research Question**

What is the impact of urban expansion on peri-urban agriculture particularly the production and supply of vegetables for the traditional markets?

1.5 Specific Research Questions

i. To what extent has urbanisation caused agricultural land conversion?

ii. What are the sources of vegetables such as Rape, Tomatoes, Cabbages, onions sold in the markets?
iii. What is the amount/percentage of the vegetables sold in the market sourced from the city farms as well as outside the city (Rape, Tomatoes, Cabbages, and onions)?
iv. Does the source or distance affect the perceived quality of vegetables?
v. What are the implications of sourcing vegetables from outside the city boundaries?

1.6 Significance of the study

The study will add to the growing body of literature on urbanisation and urban agricultural land as it will give insights into the trends of vegetable production and supply to Lusaka city.

2.0 LITERATURE REVIEW

2.1 Introduction

This section examines major debates around urbanisation and urban agriculture at global, regional and country. It also looks at specific trends in the practice of urban agriculture, implications of urbanisation on urban agriculture, and arguments concerning localised food supply chains and regional food networks. The section will also attempt to put into perspective definitional concept of urbanisation and urban agriculture in the context of this study.

2.2 Definitional Concept

Definitions of urbanisation mostly combines population size and spatial criteria and widely vary among countries depending on the purpose of the word. Beauchemin and Bocquier (2004), state that when there is physical expansion of urban areas, or when densities of rural population increase, rural areas are re-classified as urban, as boundaries move or the population thresholds for fulfilling urban definitions are reached. While (Satterthwaite et.al, 2010; Naab, 2013), states that urbanisation is the increase in percentage of the nation's population living in urban areas. In this study, urbanisation will refer to growth in the number of urban residents at a place over a period of time.

Urban Agriculture (UA) is mostly referred to as the practice of producing food within the administrative boundaries of the city. It involves the cultivation of crops, leafy vegetables, livestock raring, and aquaculture production for urban consumers (Naab, 2013). In this study, urban agriculture will refer to one specific category of the practice, which is, vegetable cultivation in urban and peri-urban areas for market supply and distribution because the focus of this study is mainly on vegetable cultivation for market supply and distribution for urban consumers.

2.3 Urbanisation

Until recently, Food System Planning has been absent in urban planning and city policy making. This is despite the fact that more than 50 percent of the world's population is living in urban areas with the proportion of urban dwellers expected to reach 70 percent by 2050 ((FAO, 2015). The anticipated increase in the number of people living in urban cities is expected to affect sustainable urban food security as conventional food supply and production systems would be severely challenged to assure food and nutrition security, particularly of the urban cities (UN Habitat, 2016).

According to McGranahan et al. (2010), urbanisation has been influenced by some demographic factors such as natural increases, movement of people from rural to urban areas, with the combination of the two factors varying regionally and nationally as well as re-classification of some areas.

Potts (2012), states that estimations of African urbanisation rates originate from estimates of growth patterns of the 1960s, when post-Independence investment in social infrastructure and industrialisation, together with the abolishment of colonial migration sanctions attracted large numbers of migrants to many capital cities.

It was estimated by the United Nations in 2012 that that Sub-Saharan Africa had an urbanisation level of 36.7% in 2011, making it and Africa as a whole as one of the fastest urbanising regions in the world with countries such as Ghana, Cameroon, and Nigeria in West Africa recording urbanisation growth

rate of 4.4% annually (Montgomery, 2008). Urbanisation has been identified (Satterthwaite et.al, 2010; Naab, 2013; Rimal,2013) as one of the factors that exert pressure on land resources, particularly agricultural land as it was increasingly being converted to other urban uses such as residential, commercial, industrial and other related uses.

In the last decade, it is estimated that developing countries lost about 14million hectares of agriculture land with much of this loss happening in countries like Nepal and India in Asia, and Ghana, Kenya, and Nigeria in Africa among other countries (Naab, 2013; Rimal, 2013). Satterthwaite et.al, 2010 and Balk et.al (2008) further observe that as urban population grows, it is likely to affect land for urban farming, as such, land is likely to be reduced in size especially in urban cities of low and middle income countries who lack strategies to guide land use change.

According to the global study of the assessment of the proportion of urban areas needed to produce actual amounts of vegetables needed for urban consumption, Zambia was among the 12 African countries that needed to reserve about 15% of its urban land to meet the actual vegetable needs. When it came to the assessment of the percentages of urban area needed to meet the recommended consumption of vegetables by the urban population, Zambia was among the 51 countries that had insufficient area to meet the recommended diet (Martellezzo et.al.2014)

The study by Martellezzo et.al (2014), revealed that 11 out of 165 countries across the globe, mostly from developing countries that included three West African countries lacked, adequate urban spaces to address demand for actual vegetable consumption of their urban population. While countries that needed to devote about 25 percent of the their urban areas to adequately meet the actual levels of vegetable consumption by urban residents, through urban agriculture hosted 39 percent of the global urban population, the category in which a country like Zambia was captured together with 12 other African countries.

The study showed that levels of vegetable consumption lower than recommended in most countries due to declining urban agricultural production among countries that had high urban population density as the amount of space available per capita was a major limiting factor for urban agriculture.

Similarly, Ramankutty and Badami (2014) conducted a study involving Sub- Saharan Africa, South Asia, and Latin America targeting countries with high urban population rate and largely representative of different geographical regions. It was discovered that the proportion of urban area required for growing basic daily vegetable intake for the urban population was driven far more by the population density. They concluded that for some countries like Democratic Republic of Congo, Ethiopia, Nigeria and Tanzania representing Sub Sahara, East and West Africa needed more than 100 percent of their available urban area to grow basic daily vegetable intake levels of 300g/capita/day (FAO/WHO, 2004) for the urban population due to high densities of urban population.

However, Djurfeldt (2014) observes that the impact of urbanisation on urban agricultural land was often exaggerated as many world cities have not urbanised at levels previously thought especially in Sub Saharan Africa and also that the impact of urbanisation on urban agriculture has not been fully evaluated.

2.4 Urban agriculture in developing countries

With increasing city population and the need to enhance urban food security, urban agriculture has been identified as one way of improving access to and distribution of food in urban areas (Martellozzo et.al,2014; Lee-Smith,2010). As such, it is expected that urban agriculture will play a major role in developing countries food supply and nutrition especially for vegetable products. This is because urban agriculture was a source of cheap food, especially vegetables, as they were cultivated closer to consumers and urban markets. Therefore, it provided opportunities for nutritional diversity, safe quality food and reduced costs associated with transportation (Lee-Smith, 2010).

For example, it is estimated that urban agriculture provided about 63 percent of fresh vegetables to urban consumers in Addis-Ababa by Co-operative farmers as they were a source of cheap and fresher vegetables than those sourced from distant places (Egziabher, 2013). Orsini et.al (2013) notes that urban farming provided about 80 percent of fresh vegetables in Yaoundé, Cameroon. Essougong (2017) states that urban farmers are expected to account for 30 percent by 2030 in most Cameroonian cities especially in Yaoundé. Abang et.al (2013) mentions that about 38% of total vegetables cultivated at national level in Cameroon was cultivated in urban areas, because vegetable farming in the country was assuming an important commercial role owing to the fact that cultivation was being done close to urban market places that lacked refrigeration facilities for perishable products.

In Uganda, Sabiiti and Katongole (2016), and Sabiiti and Katongole (2014) note that peri-urban agriculture, especially that of vegetable cultivation, was strongly entrenched in Kampala's food system as it contributed a significant amount of vegetables supplied and consumed in the city to the extent that it was now recognised by the local authority as an important policy issue as well as an economic activity of the city.

Similarly, Wright (2009) states that urban agriculture in Cuba was endorsed by the state as a mechanism for improving food security and health diets in cities as well as help reduce prices of fresh produce. Therefore, urban agriculture makes a significant part of food production, more so that it was being practiced closer to sites of consumption with the produce supplied directly to urban consumers.

Gropas (2006), observes that two distinct types of urban agriculture was being practiced in many cities across Cuba including Havana on small farming plots located in Peri-urban and urban areas, with farmers being granted ownership rights of the goods produced, which were supplied directly to urban consumers through local farmers markets.

Many authors (Egziabher, 2013; Orsini et.al, 2013; Orsini,2013, Sabiiti and Katongole,2016; Wright, 2009; Essougong, 2017) highlight the important role that urban agriculture has played in many parts of the world as it provides opportunities for improved food supply, health conditions and local economy, like in Cameroun, urban agriculture was gaining popularity and the number of urban farmers was in thousands involving private and public employees including youths and women because it provided urban Cameroonians with a variety of fresh products and cultivation was close to local markets and urban consumers (Essougong, 2017). Different case studies give important insights into different perspectives of urban agriculture and its part in sustainable vegetable production and supply for the urban population in order to promote urban food security.

Despite facing several challenges, the practice of urban agriculture has been an integral part of many cities food system world over. Therefore, with cities experiencing an increase in urban population and soaring food prices, it is expected that the role of urban agriculture will increasingly be recognised by planners and policy makers as one of the ways of enhancing urban food security despite the fact that urban agriculture was potentially being undermined by urbanisation.

2.5 Constraints of urban agriculture

Even though urban agriculture has been proven to play a significant part in improving urban food security, it has increasingly been neglected by planners and authorities in many cities of the world in preference to other land uses. According to Lynch et.al (2001), there are varying influencing factors that determine the availability of areas or amount of land needed to practice urban agriculture and among these is the urban population density which limits the amount of space available for urban agriculture. Smith (2010) and Vagneron (2007) also observe that urban agriculture can be displaced with increasing competition for land.

Naab (2013), notes that most Sub-Sharan countries were rapidly changing land use from agriculture to residential, industrial and commercial among other land uses while Chirisa (2010), adds that urban agriculture in Sub-Saharan Africa was hampered by land marketing where agricultural land was fast being converted, consequently reducing urban farming. For example, Essougong (2017), observes that just like many other developing countries , urban agriculture in Cameroun was challenged by land and water scarcity and limited spaces allocated for cultivation in preference to real estate. In Kampala, Sabiiti and Katongole (2016) say urban agriculture was facing the challenges of urban encroachment as a result of population and industrial growth while Abebe (2013) adds that urban agriculture was threatened by urbanisation.

Premat (2012), notes that urban agriculture in Cuba was facing increasing competition for other land uses by developers especially in Havana due to economic recovery that the country was experiencing while Lee-Smith (2010) states that India had lost about 2.5 million hectares of urban agricultural land in the last decade due to encroachment.

Other factors that hinder urban agriculture in many African countries are hostile official policies as there was limited support from city authorities, city planning, scarce water resources and bias towards spending for public infrastructure and services (Cofie et. al,2003; Satterthwaie et.al,2010).In Lusaka, (Hampwaye, 2007; Simatele and Binn 2008) notes that despite tolerance from the City Council for urban agricultural activities in recent years, there is absence of a clear policy and planning for the incorporation of urban agriculture in city planning.

Dubbeling and Pasquini (2010), observe that in addition to rapid conversion of urban agricultural land to non- food producing uses, urban agriculture was constrained by poor infrastructure, problematic hygiene conditions and lack of market information in many Sub-Sahara African cities.

In all these studies, the central outcome was that limited land was the major hindering factor to urban agriculture in many countries due to growing urban population. The pressure put on urban agriculture land threatens the sustainability of urban agriculture as land use conversion was the most preferred for the construction of houses and other high value properties.

2.6 Benefits of localised food systems

Food chains considered sustainable are those that produce food closer to the city and reduce the number of steps, as such, urban agriculture is considered to produce the shortest food chain supply especially for vegetables. Lee-Smith (2010) and Egziabher (2013) notes that urban agriculture provides food for urban consumers through improved availability of fresh locally produced, vegetables, decreased food loses and waste and also decreased environmental impact caused by long haul transport.

A case study by Pinter et.al (2015), involving six selected cities from Europe and Africa demonstrated that short food chain supply of vegetables had the highest overall impact rating as it produced best quality and low carbon food into the city of Crystal Palace while in Brandenburg, Germany, the study showed that urban agricultural practices were gaining popularity as they were considered to be environmentally friendly and produced the shortest food chain supply for vegetables and in Ljubijana, Slovenia, the study showed that vegetable cultivation empowered local producers economically and also the direct engagement between farmers and consumers produced the highest positive sustainability impact.

In Nairobi, Kenya, the study indicated that urban agriculture, particularly vegetable production, produced shorter food chains and made food cheaper as there were less actors in the production and supply processes while Egziabher (2013), adds that local farmers in Addis Ababa, through Co-operatives, were a source of cheap vegetables and were easily accessed as they were conveniently located to reduce on transport costs for consumers. Wegerif (2014), also states that in Dar-es-salaam, Tanzania, green vegetable supply showed that vegetable growing in urban areas was an important source of livelihood as it added economic value as well as ensured that the city was food secure.

Despommier (2011), Deelstra and Giradet (2000), note that localised food systems through urban agriculture could effectively make food available to local people with minimal costs associated with transport and environmental damage as agriculture commodities are produced and supplied within short distances. Different case studies give important insights into different European and African perspectives of urban agriculture and the role it plays in sustainable vegetable production and supply for urban population.

2.6.1 Critics of localised food system

In as much as some researchers have written and highlighted the benefits of localised food systems, through urban agriculture, some authors have criticised the practice for several reasons. Ellis and Sumberg (1998) and Zezza and Tascioti (2010) argue that the potential of urban agriculture was limited to contribute to urban food security as there was lack of quantifiable data to show the significance of agriculture activities in urban areas to improved food security, adding that urban agriculture literature was motivated by an advocacy agenda rather than an analytical rigour.

Born and Purcell (2006) suggest that advocates of local food systems risked falling into “local trap” which has three major problems which include; firstly the assumption that local food systems were desirable and yet several case studies across the globe produced different results such as greater democracy of food systems in one case and oligarchy in different case, hence, being deceptive and inconsistent. Secondly, that the localisation was inherently problematic in that it clouds ends with means, or goals with strategies thereby side tracking planner’s goal, as when a planner who desires

greater food democracy pursues localization that results in more oligarchical decision making. They argue that the local trap was misguided and posed significant intellectual and political dangers to food systems research, as such, it was important to avoid falling into the trap of localisation as the practice was resistant or reactionary to what was considered as capitalist food production systems through regional and global food systems.

To the contrary, UN-FAO,(2010) and Argenti and Marocchino (2005), state that consumers residing far away from production centres of food are likely to face challenges in accessing food items due to transportation, supplying and distribution challenges and costs as well as post-harvest losses resulting from poor packing and inadequate infrastructure.

2.7 Trends of food network systems in the cities of the South.

(Egziabher, 2013; Orsini et.al, 2013; Orsini, 2013), mentioned that urban agriculture has been key in many countries across the world due to opportunities for improved food supply and urban food security. It is important to understand how declining local agricultural production was shaping food sources, supply and distribution for retail urban consumers in developing countries who mostly relied on traditional retail markets for their vegetables as part of the main staple meal.

Azagrade and Argenti (2001), states that to strengthen urban food supply and distribution systems, means of producing food within urban areas including storage, packaging as well as systems that include wholesale and retailing among other distribution factors should be considered.

In the wake of high population and rapidly urbanizing cities, the Food and Agricultural Organization of the United Nations (FAO) is promoting the City-Region Food System approach to assure reliable and resilient food systems for cities. The city region food system offers a point of convergence for achieving sustainability of food systems and the development of rural-urban linkages.

Although data on food flows at the city level is limited in developing countries, Gunasekera (2012) conducted a study on the food flows supplying markets in the urban population for their daily food basket focusing on a survey among traders and experts in Kebeswa, Sri Lanka, with the aim of identifying potentials of more localised food system. Mukui (2012) conducted a similar study in Nairobi Kenya with specific focus on food inflows to wholesale markets to Nairobi to determine the contributions of urban-peri-urban food inflows. Dreschel et.al (2007) looked at identifying the role of urban agriculture and resource recovery potential from food waste by studying urban-rural food flows in Accra, Ghana and Ouagadougou, in Burkina-fa-so.

The results from these studies (Dreschel et.al, 2007; Mukui, 2012; Gunasekera 2012) showed that majority of the vegetables came from distant rural areas and peri-urban areas while the city's contribution of leafy vegetable volumes was very minimal. The scenario was different in Addis- Ababa, Ethiopia where 63 percent of fresh vegetables came from within the city boundaries except for other agricultural products that came from distant places.

Different scenarios presented in this section indicate that food systems in developing countries were undergoing quick transformation yet little attention was being given by planners to understand what these transformations meant for urban food security (Battersby, 2011), especially in the wake of increased urban population whose effects many countries were already experiencing.

2.8 Food governance systems in cities of the South.

Despite the increase in world food production levels, owing to improved technologies, the number of hungry people in the world is estimated to be about 1 billion, of which the majority live in developing countries (Clapp and Cohen, 2009). The food crisis riots of 2007 and 2008 and the increasing number of food insecure people in cities, indicates that food security was not only an element of increased production of food but also evolved around aspects of governance, accessibility, stability and utilisation.

Clapp and Cohen (2009), state that food security in many cities is exacerbated by rising food prices, weak infrastructure and inefficient food governance systems. This section, therefore, highlights challenges that food governance faces in developing countries.

Haysom (2015), notes that many developing countries in Africa do not have food policies that specifically look at enhancing food security in urban areas or urban cities due to lack of mechanisms to provide adequate resources and infrastructure to effectively handle urban food security. Kearns and Padidsion (2000), observe that cities rooted in traditional governance structures of hierarchy have proved to have inefficient delivery mechanism as there is little room for alternative voices from civil society and private sector especially in the absence of modern policies and systems.

At the international level, Haysom (2015) notes that globalisation is slowly changing how cities relate to urban food security processes from the previous Fordist (Production) approaches to inclusive governance and democratic food system regimes in the quest to improve urban food security, safety and nutrition. Koc and Bas (2012) add that pluralistic governance systems were an emerging and acceptable norm of urban food security, especially in developed countries.

However, Moragues-Faus (2015) states that although the narrative of inclusiveness has gained momentum in some cities, food governance space still remains highly contested, while Haysom (2015) adds that food governance in many urbanising cities of the South remain hierarchical and have difficulties incorporating availability, utilisation, stability and access as key pillars of food security.

Dubbeling and Pasquini (2010), observe that urban food security will remain problematic in many African cities due to lack of reliable food infrastructure such as transport and markets to keep cities supplied with perishable and fresh produce, therefore, exposing many to greater risk of malnutrition. In a study of five East African countries consisting of Kenya, Tanzania, Ethiopia, Uganda and Madagascar, Dubbeling and Pasquini (2010) observed that dependable infrastructure was lagging behind the rate of urban growth to strengthen urban food supply.

Additionally, Haysom (2015), points out that in many cities of developing countries especially in Sub-Sahara, food planning was mostly handled on ad-hoc basis with little attention to urban food challenges mainly due to lack of knowledge and understanding of food systems. He notes that in most cases, municipalities or departments that were mandated to tackle food security, worked in silos and lacked coordinated accurate data to help policy makers make informed decisions that would promote urban food security.

Many authors (Rocha and Lessa, 2009; Libman et.al, 2015; Crush and Frayne, 2010) argue that limitation to food access and utilisation in many developing countries contribute to malnutrition, social unrest, and unsafe foods which cause public health risks. To overcome these challenges, City or

Planning Authorities should consider the important role that inclusiveness and democratisation of food governance play in urban food security as they have the potential to promote food systems that are sustainable, efficient, and transparent.

2.9 Research Context

Lusaka is the capital city of Zambia and is considered to be among the cities that were developing at a fast rate in Southern Africa (LCC, 2016). The City of Lusaka is situated in the Central part of Zambia on the Central African Plateau and lies at an altitude of 1280m above sea level. The co-ordinates for Lusaka are 280-10' east of the Greenwich meridian and 150-30' south of the Equator. The district covers a total land surface area of 375 km2 (UN-Habitat, 2007).

In terms of land use categories, the City of Lusaka has ten (10) major land uses which include residential, commercial, industrial, agriculture, institutional, parks and recreation, cemetery, open spaces, administration, roads and utilities with residential being the largest land use covering an area of 21,176 hectares of the total land mass followed by agriculture (Hampwaye et.al, FAO, 2016)

The World Bank (2016,) estimates that Lusaka's population currently stands at two (2) million people from 1.7 million in 2010 and the population density stood at 100.4 persons per square kilometre. The population density increased from 63.5 persons per square kilometre in 2000 to 100.4 persons per square kilometre in 2010, representing an increase of 36.6 persons per square kilometre. Lusaka has annual population growth rate of 4.9 percent (CSO, 2010).

The first development plan for the city was approved in 1975 but with time, the development plan was no longer useful mainly due to many informal settlements that have developed in and around the city boundaries, where a total of 23 unplanned settlements were now legalised or were recognised as official settlements resulting from a population increase in the city (LCC, 2000).

With the recorded increase in population, open public spaces which were previously used for urban agricultural activities have been transformed into other land use classes, confining most of the urban agriculture to be practiced on private and titled parcels of land demarcated in small-holding plots. The Agricultural map for Lusaka district shows that designated urban agricultural land was grouped into four agricultural blocks in the periphery of the city confined to the East, which included places like Chainda, Ibex Hill, Kamwala and Chelenje. To the North East, places like Chamba Valley, Kabanana, Ngwerere and Waterfalls was where the city authorised agricultural activities. Other places included; Makeni, Lilayi and Kanyama to the South West as well as Barlastone and Kabangwe to the North West (DACO, 2016).

According to Rakodi (1988), urban agriculture was officially encouraged and supported by colonial government through to the independence government of the United National Independence Party (UNIP), by providing land to urban dwellers as a way of improving urban food security. By the 1980's, three distinct forms of agriculture were being practiced in Lusaka and these included small scale cultivation on commercial farms, small holding plots and scattered cultivation in open land spaces around Lusaka city (Mbimba,1999). By late-1990's, Lusaka could no longer be described as the capital city of urban agriculture because the activity had been marginalised and many restrictive measures put in place while (Hampwaye, 2007, Agyemang et.al,1997,Lubinda, 2000; Simatele and Binns 2008) notes that between 1970 to 2000, urban agriculture practice had been impacted by the diminishing available land for cultivation as a result of the expansion of other land uses particularly the expansion

of housing development projects in many parts of Lusaka such as Avondale, Nyumba Yanga and illegal settlements across several parts of Lusaka.

According to MLGH,LCC & JICA (2008), in the Comprehensive Urban Development Plan for Lusaka, the city had a total of 2,857 hectares of high-intense agricultural land possessed by commercial farmers, 2,375 hectares was low-intense agricultural land possessed by small holder farmers and 5,545 hectares was vacant land were open space cultivation was being practiced. By the year 2030, agricultural land possessed by commercial farmers will reduce by more than half as only 1000ha will be left while small-scale farm land and vacant open spaces will be reduced to zero due to urban growth.

With declining urban agricultural land and rapid population growth in the city, which entails increased demand for food, particularly vegetables which make up a basic component of the diet, there is need to understand how the declining agricultural land in the city is impacting on the supply of vegetables in the traditional (Council) markets which accounts for a large part of vegetable supplies in Lusaka. Hichaambwa et.al (2009), states that 97% of the urban consumers in Lusaka city together with three other towns along the line of rail procured their fresh produce from the traditional market system while 3 percent purchased their vegetables from the modern market system such as supermarkets and mini-marts.

This demonstrates the fact that despite the advent of an influx of supermarkets in Zambia, traditional or localised market systems have remained a major source of vegetables in most urban cities in Zambia and Lusaka in particular due to easy accessibility and affordability of the commodity by the majority of urban residents, therefore, there is need to adequately understand the procurement and supply processes at Zambia's largest fresh produce market (Soweto market) and Chainda market in Avondale as a retail markets. Understanding the procurement and supply processes at Soweto as a wholesale market and Chainda as retail market is important as it will give an understanding of the efficiencies or deficiencies of the city's food security, more so, that vegetables make up a basic component of the diet served in most households at least once a day as the main or only supplement that accompanies the starch staple meals (Nguni and Mwila, 2007).

In an effort to improve food governance and management systems, Hichaambwa (2012) notes that government through the Ministry of Local Government formulated legal and institutional framework covering all markets in Zambia to be run by boards comprising of representatives of all stakeholders but implementation of these measures has been resisted by some stakeholders, with vested interest, forcing Soweto market to be run by various ad-hoc management committees as well as compelling the sale of vegetables such as tomatoes, rape and cabbage through agents, otherwise known as brokers.

This study, therefore, also endeavoured to understand how governance issues at Soweto market affected supply and distribution processes of vegetables to retail markets.

2.2.1 Scope of study area

This research was conducted in two locations which are Soweto market as a fresh produce wholesale market situated to the Western part of central business district of Lusaka city on coordinates 15.42'01S, 28. 27'77E and Chainda market situated in the eastern part of Lusaka in Avondale area on coordinates 15.22'45.61S and 28.23'32.49 E. These areas were targeted because Soweto market was

the biggest fresh produce market in Lusaka and has the highest number of both farmers and traders conducting their business from this facility and as such, played a central role of vegetable supply and distribution in the city while Chainda market was targeted because this area is a formal residential area as well as one of the areas with large population and also surrounded by small holding plots designated for agricultural practices. Figure 1 below shows the two study areas whose distance is estimated to be between 20 kilometres.

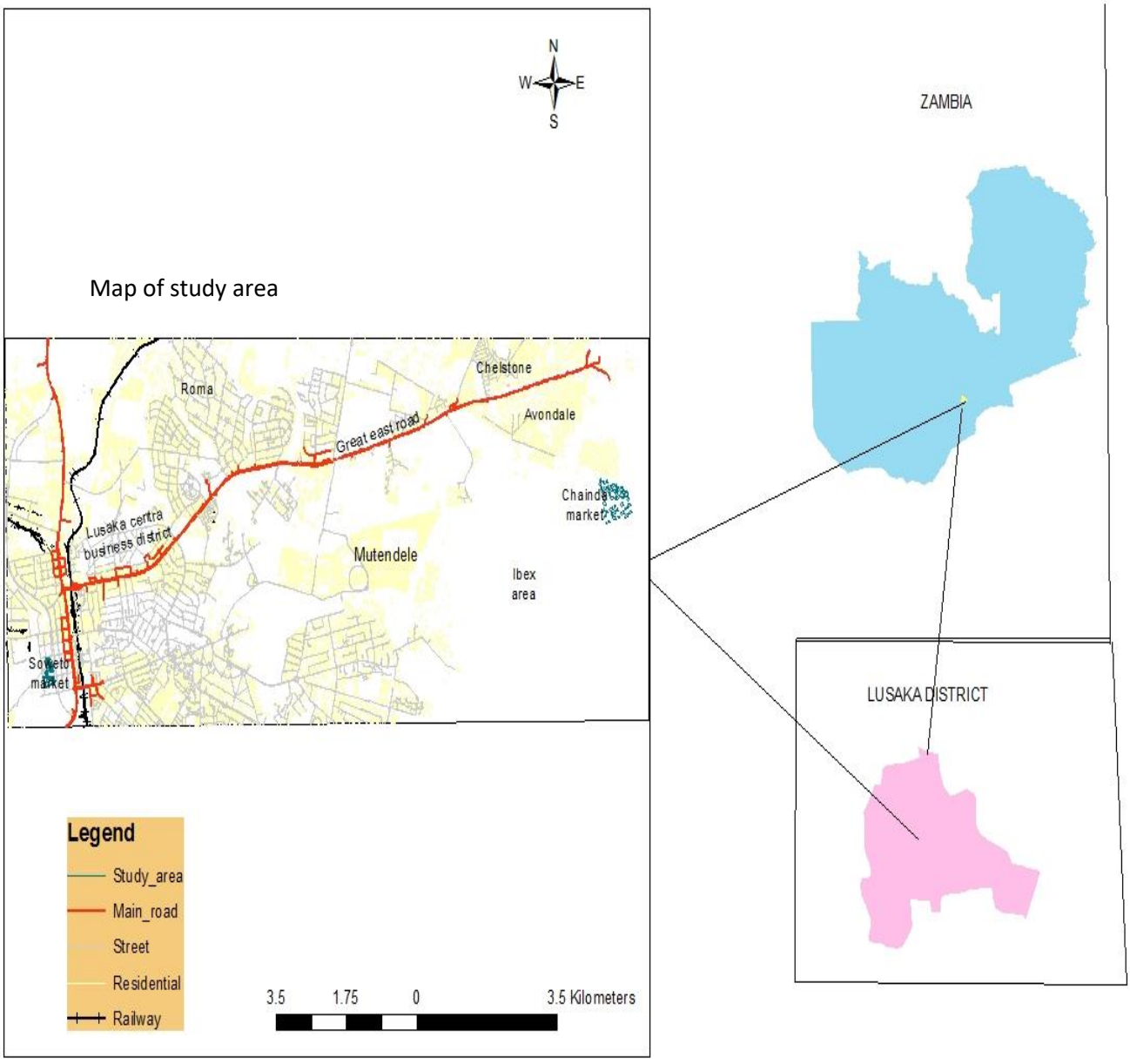

Fig.1 shows locations of Soweto and Chainda markets in Lusaka district: Source: Researcher 2017

3.0 METHODOLOGY

3.1 Introduction

All research is based on some underlying philosophical assumptions about what constitutes valid research and which research method is appropriate for the development of knowledge in a given study. In order to conduct and evaluate any research, it is therefore important to know what these assumptions are.

The research method is a strategy of enquiry, which moves from the underlying assumptions to research design, and data collection (Myers, 2009). Although there are other distinctions in the research modes, the most common classification of research methods is either qualitative, quantitative or mixed method. While the extent of land conversion was not the major element being studied in this research, it was still important to gain insights as to the extent to which it had affected and changed local food system, however, major focus was on the networks and vegetable sources for the city of Lusaka.

This section of the report highlights the methods, tools, sampling methods, sample size and actual number of the targeted population that participated in the research

3.2 Research methods

The suitability of a research method is decided by the context, purpose and nature of the research study in question. Since this research focused on the complex matters concerning urbanisation and urban food supply systems, particularly focusing on the vegetable supply to urban traditional market, it was conducted using a mixed method approach but mostly relied on qualitative research method.

The Mixed method, as a research approach, has increasingly been recognised and accepted as a sound research technique due to the recognition that human interactions with natural resources are engraved in complex, social-ecological systems (SESs). Johnson et al. (2007), defines mixed method research as a synthesis in which a researcher combines qualitative, quantitative, and mixed methods studies, and apply a mixed methods approach in order to integrate those studies, for the broad purposes of breadth and depth of understanding and corroboration. Creswell (2003), adds that the advantage of mixed method is that it allows for deeper understanding of complex research questions.

3.3 Research Design

The research study adopted Case Study as the research design for collecting data. Case studies are in-depth investigations of a single person, group, event or community. Typically, data is gathered from a variety of sources and by using several different methods for example, observations, interviews and questionnaire.

Case studies allow a researcher to investigate a topic in far more detail than might be possible if they were trying to deal with a large number of research participants (homothetic approach) with the aim of ‘averaging’ (Stake, 1995).

In this study, observations and semi-structured interviews were used in primary data collection while the sources for secondary data were journals, publications from the Lusaka City Council (LCC) and the Lusaka District Agriculture Office under the Ministry of Agriculture (DACO).

A total number of 242 respondents were interviewed comprising of 150 vegetable farmers, 40 onion traders, 35 vegetable traders at Soweto market and 15 vegetable traders at Chainda Market in order to achieve objectives one and two which were to identify the sources of vegetables for the traditional market in Lusaka as well as to understand the accessibility and processes of vegetable procurement for market supply.

The researcher also interviewed a Senior Planner (SP) at the Lusaka City Council Planning Department and a Senior Agricultural Officer (SAO) at the District Agricultural and Cooperatives Office in charge of Lusaka district to help answer the third objective which was to assess whether and why the trends of vegetable sourcing for the urban market had changed.

Additionally, in order to answer research objective 1 and specific research question (ii) and (iii), different quantities of different vegetables under study supplied to Soweto market during the period of study were recorded based on the quantities that each responded reported to have supplied. The figures of each category of vegetables were summed up by multiplying the standard weight or method of packaging against the quantity of vegetables supplied by each individual farmer.

3.4 Sampling method

There are two types of sampling designs, that is probability and non-probability sampling and in this research non probability sampling was used. Purposive sampling was also used for vegetable traders at both Soweto and Chainda markets as well as when conducting interviews with the City Planning Department and the District Agricultural office. The purposive sampling technique is a type of non-probability sampling that is most effective when one needs to study a certain trend of domain with the knowledgeable experts within. Purposive sampling may also be used with both qualitative and quantitative research techniques. The inherent bias of the method contributes to its efficiency and the method stays robust even when tested against random probability sampling (Bernard, 2002).

3.5 Target Population

The research involved the following study population, as indicated below. The decision to have this population was guided by some reasons ranging from the knowledge possessed as City Planners, Policy and decision makers, exposure by traders and vegetable cultivators both those that have been cultivating and trading for a short and long time. The following numbers of respondents were interviewed;

(i) Vegetable Wholesalers (Rape, Tomatoes, Cabbage, Onion)

(ii) Vegetable traders at Soweto market

(iii) Vegetable traders at Chainda market

(iv) Ministry of Agriculture Official

(v) Country Planning Official

3.6 Sample Size

When determining sample size for qualitative studies, it is important to remember that there are no hard and fast rules. There are, however, two considerations to be noted (Creswell, 1998):

(a) What sample size will reach identification of consistent patterns?

(b) How large a sample is needed to represent the variation within target population?

The research had a total sample size of 242 participants consisting mainly of farmers and traders of identified type of vegetables as well as government officials as shown below.

(a)Vegetable farmers

i. Rape - 50 farmers
ii. Tomatoes - 50 farmers
iii. Cabbage - 50 farmers
iv. Onion – 40 traders

(b) Vegetable traders at Soweto market - 35
(c) Vegetable traders at Chainda market- 15

(d) 1 Ministry of Agriculture Official

(e) 1 Country Planning Official

3.7 Data Collection

3.7.1 Primary Data

In all the three listed objectives, semi-structured interviews and observation were used as a tool for primary data collection concerning vegetable farmers and traders at the wholesale market (Soweto) and retail market at Chainda in Avondale. Semi-structured interviews were also used regarding officials from the City Council Planning Department and the District Agricultural Co-ordinating Office. Table 1 below summarises strategies, methods and tools that were used for collection of both primary and secondary data. Semi-structured interviews were used because they had an advantage of being flexible as they consisted of open and closed-ended questions and also allowed the use of follow-up questions during interviews.

At Soweto market, primary data was collected every day for the period of two weeks instead of the initial planned period of four weeks due to some difficulties experienced at the start of the study as explained in detail in the later chapter. Observational field visits to St. Peters' Anglican Church Tuesday market situated along Burma Road in Kabwata, Cross roads in Woodlands and Saturday market in Kabulonga Townships were done on the market days when the markets were functional.

Additionally, observational visits to T4 junction market, situated east of Lusaka district near the Kenneth Kaunda International Airport, were equally undertaken including observations of the entire supply and distribution processes at Soweto market.

The researcher further utilised the visits to markets, particularly Soweto market to interview traders and farmers when permission was granted by the Branch officials to engage in interviews. Among the

questions asked were the challenges faced in transportation of vegetables, challenges of vegetable cultivation within and outside Lusaka city, major sources of the selected vegetables for Lusaka city and trends in vegetable procurement and distribution.

At Chainda market, vegetable traders were also interviewed to give an account of their experiences in terms of the procurement and distribution processes as well as to identify major sources of their vegetables for the retail market.

The researcher also conducted semi-structured interviews with the City Planning Office and the Ministry of Agriculture for primary data to assess whether and why the trends of vegetable sourcing for the urban market had changed. Among the questions asked were; how much of the designated urban agricultural land had been converted to other land uses, what has been the source of vegetables for Lusaka over the years, and what was the impact of urbanisation on vegetable cultivation within Lusaka district.

3.7.2 Secondary Data

Secondary sources of information is data neither collected directly by the researcher nor specifically for the researcher. This information is collected from diverse sources of documents which include journals, institutional reports and publications and other electronically stored information. It is often referred to as desk research (Kombo and Tromp, 2006)

In this research, Secondary data particularly for the 1st and 3rd objectives were collected through reviews of annual reports from institutions that conducted research on urban food security, urbanisation or related topics and academic publications including reports from the Lusaka City Council in order to compliment primary data in answering questions of the mentioned objectives.

NO.	Objective	Primary Sources		Secondary Sources
		Interviewee(s)	Method	
1	To identify the sources of vegetables for the traditional market in Lusaka	Vegetable farmers at Soweto, vegetable traders at both Soweto and Chainda markets, Ministry of Agriculture	Interviews	Annual reports, Publications, and Quarterly reviews
2	To understand the accessibility and processes of vegetable procurement for market supply	Vegetable farmers at Soweto , vegetable traders at both Soweto and Chainda market	Interviews	Publications
3	To assess whether and why the trends of vegetable sourcing for the urban market have changed	Lusaka City Council, Min of Agriculture	Interviews	Publications and Annual reports

Table1. Shows summary of methods and tools used for primary and secondary data collection

3.8 Data analysis

This research used themes to represent topics which came up frequently among respondents and coding to highlight the emphasis or importance an issue was mentioned by frequency.

Triangulation was also used to validate claims that were highlighted by respondents; therefore, the analysis is presented in form of graphs, tables, pictures, maps and direct quotations from respondents followed by a detailed analysis.

3.9 Limitations

During the period of this research (June, 2017), the city experienced security lock-down at Soweto market due to the fact that one of the biggest and adjacent markets (City Market) was gutted by fire. This caused delays in starting data collection as the fire happened few days before the researcher could start collecting data.

Instead of collecting data for the planned period of four weeks, data was collected in two weeks as the researcher had run out of time due to delays in clearing the area by state security agents.

The researcher further faced some limitation in interviewing transporters as non-of them was willing to participate in the research, claiming that they were mere employees or drivers for transporters and as such they claimed that they were not allowed to give interviews or were new at the job and did not understand anything.

Additionally, some farmers were apprehensive in giving out detailed information claiming that they were scared of harassment by the agents and some officials who were in charge of running the markets, specifically at Soweto market.

Further, secondary data and information on the food system networks was scattered among different institutions and groups and markets did not keep records. There was also an absence of a common readily accessible platform such as data bases or websites where information could be accessed and retrieved, therefore, this could limit the deeper understanding of some of the objectives set out in this study.

3.2.1 Ethical considerations

This study involved working with vegetable farmers and traders both at the wholesale and retail markets for primary data collection. The research required that the respondents express their perception and experiences of the subject under study.

The researcher ensured that anonymity and confidentiality was up held and that information given by each respondent was not shared with other research participants. Participation in the research was voluntary and this was emphasised by both market leadership and the consent form which was read out to the respondents as they were not willing to sign the forms.

The researcher was transparent by stating the reasons for the research to the participants and undertook to adhere to all ethical considerations as guided by the faculty's ethics requirements. A copy of the final research report will also be made available to the leadership of the participating markets and the participating organisations.

4.0 FINDINGS

4.1 Introduction

This chapter presents findings of the study based on the three objectives and key questions that the study sought to answer. Findings were presented according to themes as well as triangulated to validate responses from various individuals and organisations that participated in the study.

The overarching aim of the study was to understand the impact of urban expansion on peri-urban agriculture, particularly the production and supply of vegetables for the traditional markets. This was done in order to understand the extent to which urbanisation had caused agricultural land conversion as well as identify sources of vegetables sold in the markets in Lusaka (Soweto and Chainda), challenges experienced by farmers, traders and transporters in the production, supply and distribution process.

On this basis, the project sought to address three objectives, namely to (1) identify the sources of vegetables for the traditional markets in Lusaka, (2) understand the accessibility and processes of vegetable procurement for market supply, and (3) assess whether and why the trends of vegetable sourcing for the urban market have changed as highlighted in the findings below.

4.2 Overview of Soweto market

This research established that Soweto market is the biggest fresh produce wholesale market in Lusaka. It is a point of convergence for the city's regional food network and also serves as the main distribution point of various fresh produce sold in different retail traditional markets in the city. Both small scale and commercial farmers from within Lusaka and different rural towns especially those near the city, are major suppliers of the vegetables to the market.

Soweto market is supposed to be managed by a market board comprising of different stakeholders as established by the Market and Bus Stations Act of 2007 by government through the Ministry of Local Government, but, the situation was different on the ground. This research established that different categories of fresh produce had their own association managing that section or sector. For example, Cabbage had a different association from Rape and Tomato, so was onion belonging to another association but all under the supervision of officials mainly from the ruling party and referred to as branch.

It was further established that agents were an influential and major cohort of market management as it was their responsibility to determine price of various commodities sold at the market. Agents were not employees of the local authority or registered with any regulatory body but covertly worked for and acted on behalf of branch officials as their employees. It was mandatory at Soweto market for farmers to sell their produce through agents as failure to oblige meant that a farmer would not be allowed access or allocated space where to sell their produce.

The Study further showed that trading hours at Soweto market started as early as 05:00 hours in the morning and ended in the late afternoon with peak trading hours starting at 06:00 hours to 10:00 hours. The market also attracted traders from different parts of the city to order vegetables for resell in the retail traditional market.

4.3 Sources of vegetables for the traditional markets in Lusaka

The increases in urban population has brought with it challenges that have threatened the sustainability of urban agriculture as land use conversion was the most preferred practice in many cities across the globe so as to build houses and other high value properties to accommodate the growing population.

Urban agriculture and food security has lately drawn a lot of interest among city planners in many cities of the world because of its contribution to food and nutrition security, livelihood and income generation, and poverty alleviation for urban livelihoods practicing urban agriculture.

With the anticipated increase in population in the city of Lusaka by the year 2030, there is need to have sustainable urban food systems that will be able to make Lusaka food secure and resilient in the wake of increased city population.

Principal vegetables for this study comprised of Rape, Onion, Tomatoes and Cabbages because these constitute basic component of the diet served in most households in Zambia at least once a day as the main or only supplement that accompanies the starch staple meals (Nguni and Mwila, 2007).

The tables below show different places or towns that were frequently producing and supplying selected vegetables to Lusaka

CABBAGE

Source	Quantity in Kilograms	Quantity in Percentage	Distance to Market	Number of Farmers
Lusaka	107495 kg	81%	30 km	33
Chongwe	11200 kg	8%	60 km	9
Chibombo	5300 kg	4%	73 km	3
Mwembeshi	4000 kg	3%	50 km	1
Chilanga	2400 kg	2%	30 km	2
Chisamba	1400 kg	1%	80 km	1
Mumbwa	1160 kg	1%	200 km	1
Grand Total	**132955 kg**	**100%**		**50**

Table2. Shows quantities of cabbages supplied to Soweto market by different towns

Out of the 50 farmers interviewed in this category, 33 came from within Lusaka, 9 came from Chongwe district about 60 Kilometres east of Lusaka, 3 from Chibombo district about 73 kilometres north- east of Lusaka, 1 from Mumbwa district about 200 kilometres west of Lusaka. Others were 1 from Mwembeshi district about 50 kilometres west of Lusaka Lusaka, 2 from Chilanga district about 30 kilometres south of Lusaka and 1 from Chisamba about 80 kilometres north of Lusaka district.

A total of 107495 kilograms representing 81 percent of cabbages sold at Soweto market during the period of this study was weighed and recorded from Lusaka farmers while 11200 kilograms representing 8 percent of cabbages supplied to Soweto was recorded from farmers from Chongwe and 5300 kilograms representing 4 percent of cabbages was recorded from Chibombo district farmers.

These quantities were recorded in four days of the two weeks period of study and the summed quantities as shown in table three above were obtained after multiplying the average weight of one kilogram per head of cabbage by the number of supplied quantities of cabbages by each respondent from the towns indicated above. The data as indicated in Table 3 above shows that Lusaka district was the biggest producer and supplier of cabbages mainly produced by commercial farmers situated in the southern parts of Lusaka specifically Lilayi and Makeni areas, seconded by Chongwe and Chibombo districts respectively.

Commercial farmers dominated the production and supply of cabbages because they were able to meet production costs associated with cabbage cultivation such as electricity for irrigation, chemicals and fertilizers as well as use of own transport for transportation of commodities from points of production to the market. Shorter distance from points of production to the market meant that the commodity has low food miles as it was being produced and transported to markets which were situated within 30 kilometres

It was further observed that commercial farmers produced more of cabbages because on average the commodity fetched relatively higher prices as compared to other vegetables and had also longer shelf life as compared to commodities such as rape and tomatoes taking into account lack of adequate storage facilities at Soweto market.

RAPE

Source	Quantity in Kilograms	Quantity in Percentage	Distance to market	Number of Farmers
Chongwe	110150 kg	78%	60 km	38
Lusaka	18150 kg	13%	30 km	7
Chibombo	13250 kg	9%	73 km	5
Grand Total	**141550 kg**	**100%**		**50**

Table3. Shows quantities of rape supplied to Soweto market by different towns

Out of 50 farmers interviewed in this category 38 farmers came from Chongwe district about 60 Kilometres east of Lusaka, 7 came from within Lusaka district and 5 came from Chibombo district 73 kilometres north- east of Lusaka district.

A total of 110 thousand kilograms representing 78 percent of rape supplied to Soweto market during the period of this study was weighed and recorded from Chongwe farmers while 18 thousand kilograms representing 13 percent of rape was weighed and recorded from Lusaka farmers and 15 thousand kilograms representing 9 percent of rape was weighed and recorded from Chibombo farmers.

These quantities were recorded in the four days of the two weeks period of study and the summed quantities as shown in table four above were obtained after multiplying the standard weight of 50 kilograms of rape packed in standard grain bags by the reported number of supplied quantities by each respondent from the towns indicated above.

The figures in Table 4 above shows that Chongwe district was the biggest producer and supplier of Rape while Lusaka was second and Chibombo was third. This indicated that Lusaka was not self-sufficient in terms of Rape production but was supplemented by neighbouring satellite towns, due to the fact that Rape required a big amount of land, water, and labour which Lusaka district seemed to lack.

TOMATOES

Source	Quantity in kilograms	Quantity in percentage	Distance to market	Number of Farmers
Chongwe	171050 kg	45%	60 km	26
Mumbwa	62550 kg	17%	200 km	9
Chisamba	52500 kg	14%	80 km	4
Lusaka	50450 kg	13%	30 km	7
Chibombo	34500 kg	9%	73 km	3
Rufunsa	5600 kg	2%	150 km	1
Grand Total	**376650 kg**	**100%**		**50**

Table 4. Shows quantities of tomatoes supplied to Soweto market by different towns

Out of 50 farmers interviewed in this category of vegetables, 26 farmers came from Chongwe district about 60 Kilometres east of Lusaka, 9 farmers from Mumbwa district about 200 kilometres west of Lusaka and 4 farmers from Chisamba district about 80 kilometres north of Lusaka district. Other farmers included 7 from within Lusaka, specifically Makeni area located to the south of the district while 3 farmers came from Chibombo district about 73 kilometres north- east of Lusaka and 1 farmer from Rufunsa district about 150 kilometres east of Lusaka district .

A total of 171050 kilograms representing 45 percent of Tomatoes sold at Soweto market was weighed and recorded from Chongwe farmers, while 62550 kilograms representing 17 percent of Tomatoes was recorded from Mumbwa farmers and 52500 kilograms representing 14% of tomatoes was recorded from Chisamba farmers. Other recordings included 50450 kilograms representing 13% from Lusaka district, 34500 kilograms representing 9 percent of Tomatoes from Chibombo district and 5600 kilograms representing 2 percent of Tomatoes from Rufunsa district as shown in table 5 above.

These quantities were recorded in the last four days of the two weeks period of study and the summed quantities as shown in table five above were obtained after multiplying the standard weight of 50 kilograms of tomatoes packed in the standard wooden box by the reported number of supplied quantities by each respondent from the towns indicated above.

The above data shows that Lusaka district mostly relied on supplies from other districts to meet its demand for Tomatoes. Chongwe district was the biggest producer and supplier of Tomatoes followed by Mumbwa and Chisamba districts respectively. However, Lusaka produced some quantities of Tomatoes mainly from small holding farms situated in Makeni area, south of the district.

The majority of the farmers from Lusaka, who were interviewed, indicated that they preferred cultivating Tomatoes on their small parcels of land as the crop did not require huge portions of land as it was high yielding and enabled them to gain some profit.

It was further reported that Soweto market was normally supplied with huge quantities of Tomatoes during dry season as most of the farmers, both from Lusaka and outside, preferred producing tomatoes during this period of the year due to less demand for pesticide chemicals as there were less diseases affecting the crop during the dry season, as such, it was produced cheaply. However, some farmers, especially those from outside Lusaka reported incurring to losses due lower prices that were prevailing at the market during this period of study as the supply of Tomatoes outstripped demand for the commodity, coupled with high transportation charges as the majority of the farmers hired trucks to transport the commodity to the market.

This was forcing some farmers to find alternative markets were they could supply the commodity at profitable prices, as holding back the commodity to push for high prices was not feasible due to the fact that neither the farmers nor Soweto market had refrigeration facilities to prevent the commodity from going to waste.

ONIONS

Source	Quantity in Kilograms	Quantity in Percentage	Distance to Market	Number of Traders
Mkushi	70570 kg	49%	300 km	15
Lusaka	37940 kg	26%	30 km	18
S. Africa	23760 kg	17%	2000 km	4
Kafue	12200 kg	8%	50 km	3
Grand Total	**144470 kg**	**100%**		**40**

Table 5. Shows quantities of onions supplied to Soweto market by different towns

The quantities shown above were recorded in two days of the two weeks period of study and the summed quantities as shown in table six were obtained after multiplying the standard weight of 10 kilograms per porch of Onions by the reported number of supplied quantities by each respondent from the towns indicated above.

In this category of vegetables, 40 traders at Soweto market were interviewed as these were the owners of the stalls or trading spaces where Onion was being sold at the market. It was observed that these 40 traders owned an average of three (3) trading spaces in the onion section at Soweto market and employed other people to sell the commodity on their behalf.

It was further observed that local Onion farmers, especially those from within Lusaka, were selling their crops to onion vendors whilst the crop was in the field, entering into some form of contract obligation with vendors, hence, farmers were not allowed to sell their products but supply to Onion vendors who were selling directly to consumers.

The practice of contract farming was prominent among Onion farmers, especially those from Lusaka, as there were only few producers and could not manage to meet the demand for Onion in the city, as

a result, there was competition among Onion vendors to buy the commodity whilst in the field so that they could remain in business.

The majority of the vendors interviewed indicated that Onion farmers were not allowed to enter the market directly to avoid competition with vendors. They were not allowed to be involved in fixing prices for the commodity oo.

Out of the 40 vendors interviewed, 15 indicated that they routinely sourced their supplies from Mkushi district about 300 kilometres north of Lusaka. Eighteen vendors sourced their supplies from Commercial farms situated within Makeni area of Lusaka as well as Lusaka west. Four sourced their Onion supplies from South Africa about 2000 kilometres South of Zambia, while 3 sourced the commodity from Kafue district about 50 kilometres south of Lusaka district.

A total of 70570 kilograms representing 49 percent of Onions sold at Soweto market during this period of study was reported to have been sourced from Mkushi district, while 37940 kilograms representing 26 percent of onions was reported to have come from Makeni area of Lusaka and 23760 representing 17 percent Onions came from South Africa. 12200 kilograms representing 8 percent was reported to have been sourced from Kafue district as indicated in table 6 above.

It was further reported that sources of Onions changed according to seasons especially in rain season during which the bulky of the commodity came from Malawi and South Africa. This was because the majority of local farmers did not have dryers to enable them continue producing Onions during rainy season as they relied on sun-drying method to preserve onions.

Onions were sold at a higher price than other selected categories of vegetables (both during the rainy and dry seasons) because of being sourced from distant places.

The high prices for Onions deprived those categories of people with less purchasing power from making the commodity a vital component of their diet. In this regard, the Onion vendors were reported to have a large clientele among restaurant owners and other fast foods outlets as these could afford to buy the commodity.

The vendors further reported that Onion prices were generally high during rainy season because local farmers were not producing the commodity making it to be in short supply as they relied on supplies from South Africa and Malawi which were expensive because of high transport costs.

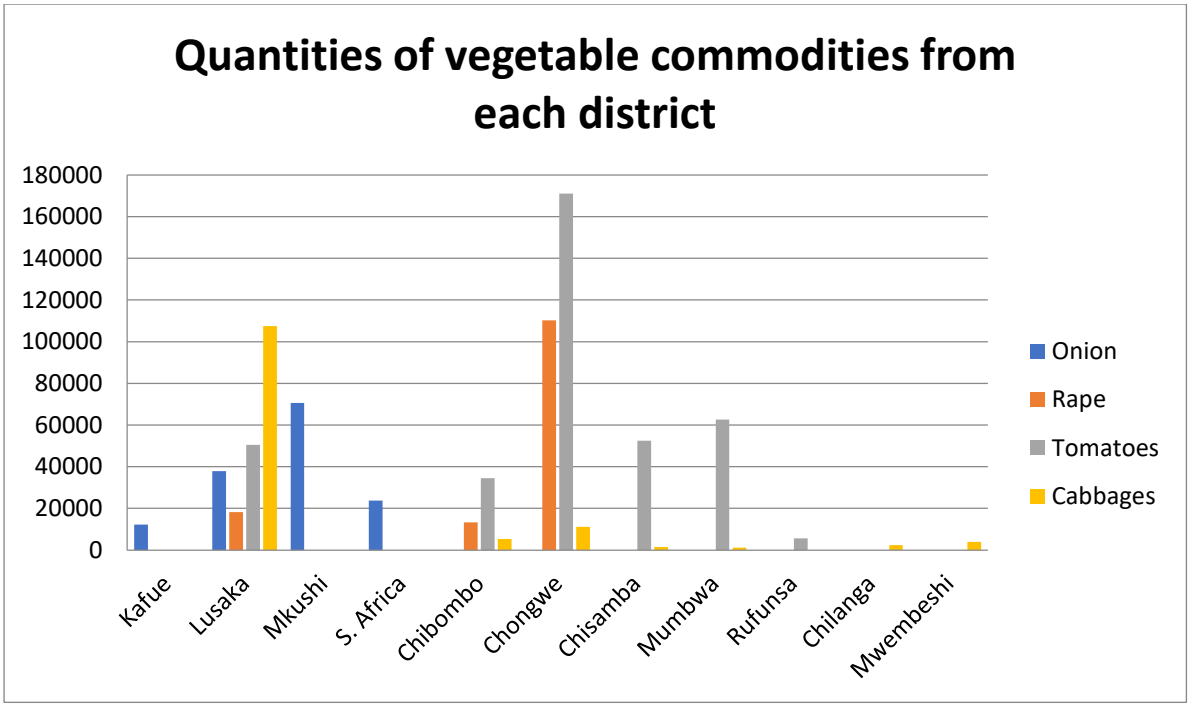

Fig.2 Shows quantities of selected vegetable commodities from different districts. Source: Researcher 2017

Figure 2 above shows quantities of the selected vegetables being produced by each district and or country that was recorded to have been contributing to vegetable supplies to Lusaka. It shows that Lusaka district produced all categories of vegetables, in small quantities, except for Cabbages and Onions which were produced in huge volume within Lusaka.

The study further established that majority of producers from within Lusaka district were commercial farmers from Lilayi and Makeni areas. While a small number of small scale farmers were from Lusaka West and none were from Lusaka East although it was one of the areas designated a as farming block for Lusaka district. Lusaka East seemed not to be active in urban agriculture as the area has experienced land use transformation in the past years from mainly agriculture to new residential areas such as Meanwood, Twin Palm, Waterfalls, Salama Park, Mtendere East and Obama among others, these places were previously farm lands and designated as agricultural areas.

Fig2 above indicate that although Lusaka district produced all categories of the selected vegetables, the quantities were not sufficient to meet vegetable demand for its population but relied on other districts especially neighbouring rural districts such as Chongwe, Chibombo and Chisamba for its vegetable supplies. This means that rural satellite towns played an important role in making Lusaka food secure in terms of vegetable supplies. Figure 2 further indicates that Chongwe district was the overall major district that supplied all categories of vegetables to Lusaka followed by Chibombo district as well as other rural districts within the distance of 200 kilometres to Lusaka.

This indicates that the immediate nearby rural towns were major contributors of vegetables to Lusaka district except for Kafue and Chilanga districts which are situated 50 and 30 kilometres respectively to the south of Lusaka.

Despite the proximity of these two towns to Lusaka and having adequate water resources, particularly for Kafue as it was hosted the Kafue River, urban agricultural activities were low. This was mainly due to the fact that the districts were industrial hubs as they were home to textile, fertilizer, shoe, steel and iron industries that have employed much of the labour force away from the agricultural sector.

It is equally important to note that all major supplying town were situated along major roads to Lusaka such as the great North road, great East roads and Mumbwa roads. This showed that good road network was vital to vegetable supply and distribution as it made the producers to easily access the market.

The research established that sources of vegetables for Lusaka varied and have changed over the years, from areas that previously used to produce vegetables within Lusaka, to other places outside the administrative boundaries of the district. Vegetable traders from different parts of Lusaka had come to depend on Soweto market for their vegetable supply as a wholesale market because farmers, mostly from outside Lusaka, sold their commodities from there. For example, out of the 15 traders interviewed at Chainda market in Avondale, 4 indicated that they procured their vegetables from Soweto market while 11 sourced vegetables from T4 market located at the junction of Kenneth Kaunda international airport, while all the 30 traders interviewed at Soweto market, indicated that they depended on Soweto market as a source for their vegetables. This was because near-by farming areas where they used to previously order their vegetables from were no longer productive or the quantities were not enough to cater for the market.

Below are some excerpts from interviews conducted with traders at Chainda and Soweto markets:

"I have been selling vegetables for 30 years now. When I started, we used to order vegetables from the farms in Ibex hill because it was near, but it is no longer the case now, there is little being produced from those farms. Most of them are no longer producing, as a result, most of us here order vegetables from the airport turn-off (T4) intercepting farmers that come from Chongwe or sometimes from Soweto market when there is little supply at the airport turn-off",(Interview with Rape trader at Chainda market in Avondale, Lusaka, on 16th June, 2017).

"I started selling vegetables in 1983 at Matero market when I started the vegetable trade; we used to order our vegetables from surrounding farms in Ngwerere, Kabangwe and Barlostone. There was no Soweto market because the local farms used to produce enough vegetables to satisfy demand for vegetables in Lusaka, but now if you go to those places, you will find that they are now residential areas, people have built houses everywhere so I have to come to Soweto to order vegetables for my business" (Interview with a trader from Matero township situated to the north of Lusaka at Soweto market on 12th June, 2017)

Figure 3 below maps out towns that continually supply vegetables to Lusaka.

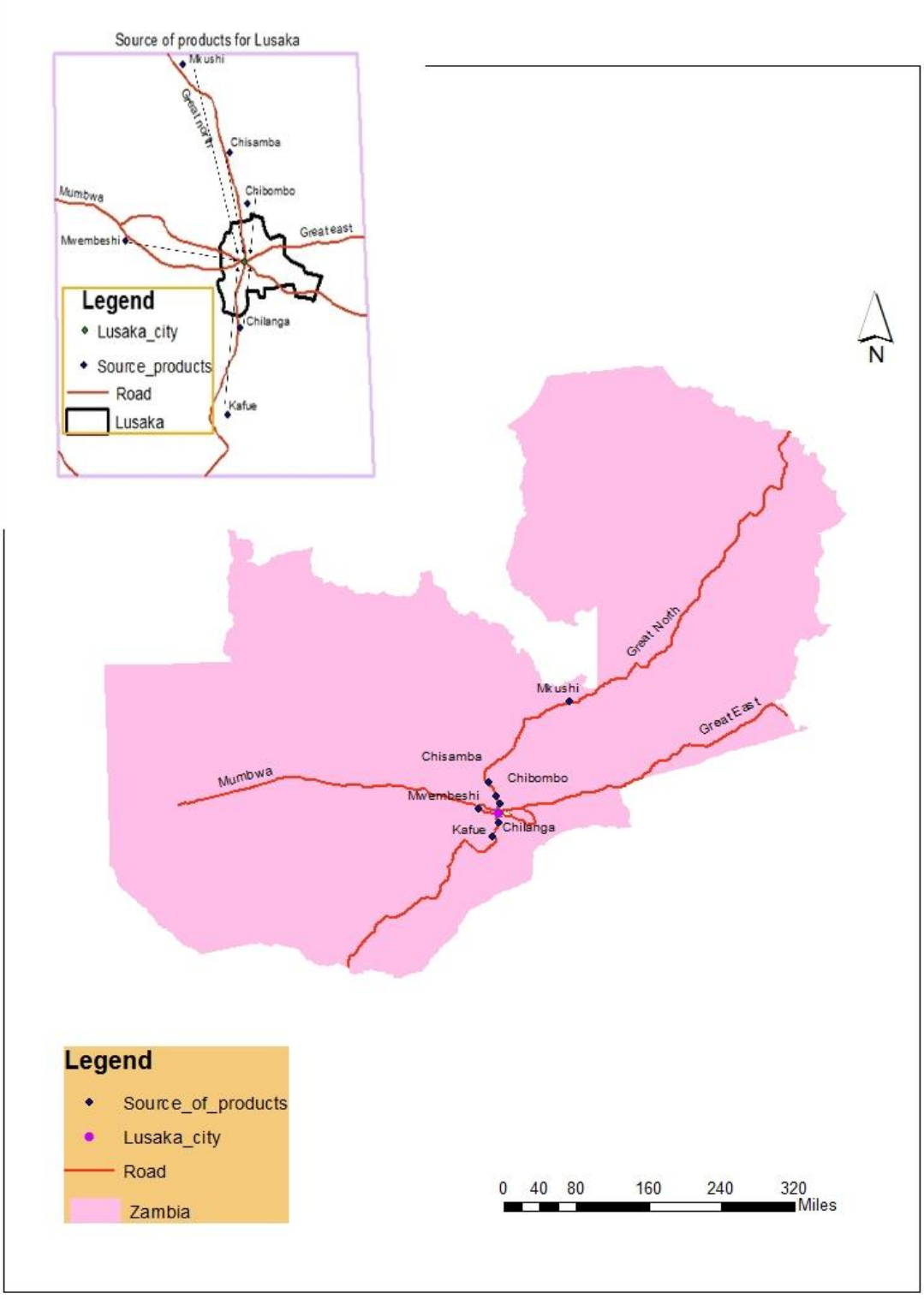

Fig 3.Shows map of towns that continually supplied vegetables to Lusaka. Source: Researcher 2017

4.4 The accessibility and processes of vegetable procurement for market supply

As noted by Nguni and Mwila (2007), vegetables make up a basic component of the diet served in most households at least once a day as the main or only supplement that accompanies the starch staple meals. Hichaambwa et.al (2009), shows that 97 percent of the urban households, Lusaka included, procured fresh produce from the traditional market system as compared to 3 percent that purchased its vegetables from the modern market system such as supermarkets and mini-marts.

Since various studies (Nguni and Mwila, 2007; Hichaambwa et.al, 2009) show that traditional markets still remain a major source of vegetables in urban areas, there is need to understand if there are changing processes and how these changes would affect or enhance food security in Lusaka district.

The thematic areas presented below show what were considered major challenges or prevailing situations on the ground concerning accessibility and processes of vegetable procurement for the traditional markets, where 97 percent of urban households procured their fresh produce from.

Many farmers from different rural towns and those from within Lusaka take their vegetables to Soweto market for sell as it is a major wholesale market in Lusaka as well as a distribution point to many secondary markets within the city. Many traders from the city depend on Soweto market for wholesale purchases of vegetables for resell in different markets across the city while Chainda market is a traditional retail market which services the population around Avondale, Meanwood and Chainda as residential areas, including small holding farms, within Ibex Hill were initially designated for urban agriculture.

A total of 190 respondents who included 160 farmers and 30 traders were interviewed at Soweto while 15 vegetable traders were interviewed at Chainda market in Avondale during the period of study using semi-structured interviews. Respondents were permitted to give multiple responses which they thought were important and related to the topic, therefore, to come up with these thematic areas, the number of respondents that gave same answers was scored to rate its importance as well as guide in assigning the levels of significance.

The thematic areas presented below indicate issues and challenges that were highlighted by both traders and farmers as matters that were problematic to vegetable availability, accessibility and distribution to the city of Lusaka in order to enhance food security.

4.4.1 Transportation

Out of 190 respondents interviewed at Soweto market, who comprised of 160 farmers and 30 traders, 120 respondents mentioned that hired transport was the biggest challenge while 50 out of 190 highlighted bad road networks from their areas to the market and 20 respondents out of 190 mentioned demands for bribes by Police officers at road blocks before they could be allowed to enter Lusaka district to sell their vegetables.

The research established that 130 farmers at Soweto market, particularly those from outside Lusaka, used hired transport to access the market while 30 used their own transport. Most of those that used their own transport were commercial farmers including a small number of small scale farmers from within Lusaka. It was further indicated that some farmers who had the same category of vegetables that they wanted to take to the market hired trucks as a group in order to share the cost of transportation. At the T4 market situated at the junction of Kenneth Kaunda International Airport,

east of Lusaka, the majority of farmers transported their produce using their own bicycles and small vans due to the fact that distances from the production centres to the location were considered short as they were within 30 kilometres radius from the administrative boundaries of Lusaka.

Hired transport was mentioned as the biggest challenge that both farmers and traders faced because it was expensive to transport commodities from longer distances and in some cases pushed the prices of commodities upwards in an attempt by producers to recover money spent on the cost of transportation, hence, passing on that expense to the consumer.

In some instances, farmers were subjected to longer hours than necessary in transporting commodities from areas of production, which were mostly in rural areas and had bad road networks. This also caused frequent break-downs of hired vehicles forcing farmers to spend a lot of time on the road before they could reach the market in good time. This in turn compromised the quality and safety of their vegetables particularly Rape and Tomatoes.

The researcher observed that many farmers from distant places complained of having their products damaged or quality compromised in the transportation process due to longer distances, hence, affecting the prices negatively as traders preferred to order vegetables that appeared fresh and of high quality.

All the 30 traders at Soweto and 15 traders at Chainda market indicated that transportation was a challenge in that they were expected to be at the market as early as 04 AM in the morning so that they could be able to order their commodities in good time for resell in markets across the city.

It was further observed that traders who ordered their vegetables, either from Soweto or T4 market, hired transport as a group in order to lessen individual costs. However, the majority of the traders both at Soweto and Chainda market, indicated that transportation costs were passed on to consumers.

This could possibly force some urban households who could not afford buying vegetables at certain prices to be food insecure or compromise on their health as they could lack vegetables which were a source of essential vitamins and minerals.

This study established that among the implications of sourcing vegetables from outside the city boundaries were delays by farmers to reach Soweto market in good time as a result of bad road network, hence, increasing loss margins due to damages and decrease in perceived quality as a result of the commodity being subjected to direct sunlight for a longer period of time.

Additionally, some farmers indicated that the longer the distance from Lusaka was, the higher the transportation charges became, which sometimes caused farmers to incur losses as they could not recover expenses due to the fact that sometimes wholesale prices of commodities at Soweto market were low.

It was further established that longer distances, especially from rural areas, were a challenge as some respondents indicated that during rainy season transporters stopped servicing some routes due to bad roads, thereby, causing farmers to be stranded with their produce while others stopped producing vegetables in order to concentrate on other crops such as Maize which would be ready for harvest and transportation after the rainy season.

The demand for bribes by Police officers at road-blocks also affected vegetable supply; safety and quality in the sense that vehicle were impounded for long hours until bribes were paid. This meant that the longer the vehicles were impounded, the less fresh vegetables became, therefore, compromising the health of consumers. This also discouraged some farmers from bringing their commodities to the city because of high possibilities of incurring losses due to unplanned expenses, thereby, affecting vegetable availability in the city. The study established that transportation challenges affected not only vegetables distribution for consumers in the city but also hinders some farmers from continuing with vegetable growing for their livelihood.

The study further established that traders preferred to procure vegetables from places that were conveniently located, in terms of short distances, and had a good road network for easy transportation. For example, 11 out of the 15 traders at Chainda market indicated that they preferred ordering their vegetables from T4 market because the distance was shorter compared to Soweto market and the place was easily accessible as it was located along the main high way.

4.4.2 Storage facilities

From 190 respondents interviewed at Soweto market, who included both farmers and traders, 100 respondents indicated that lack of storage and refrigeration facilities at Soweto market was a challenge as they were forced to sell their products, particularly Rape and Tomatoes within a day or two, at times at very low prices to avoid losing their products completely. 75 out of 190 respondents mentioned lack of hygiene facilities and running water to make the trading environment conducive for both farmers and traders while 15 respondents highlighted congestion as well as limited trading spaces as challenges they faced at Soweto market.

The study found that lack of storage facilities compromised adherence to food safety standards as vegetables were mostly handled or stored in an unhygienic manner This posed a danger not only for the spread of food borne diseases but also contributed to deficiencies of micro-nutrients among urban residents.

Additionally, the research established that there was no quality control, sorting or health inspection for all categories of vegetables in order to ensure that what was sold on the market was good for human consumption. Therefore, lack of quality control or certification meant that consumers were more vulnerable to eating contaminated vegetables.

Furthermore, the study showed that lack of sorting and quality control made farmers vulnerable to manipulation by agents, who sometimes sold commodities at lower prices to the extent that farmers did not make profits but only benefited agents who paid themselves money raised from sales as commissions.

It was also observed that despite farmers paying daily market levies to the City Council to be allowed entry into the market to sell their commodities, trading spaces were being controlled and managed by people whom they called “branch” officials who further engaged agents to be selling vegetables on behalf of famers.

This meant that farmers who did not want to sell their vegetables through agents could not be allocated trading spaces to sell their commodity at Soweto market. Some farmers that resisted were harassed and had their products stolen or were completely banned from trading at Soweto market.

Limited trading spaces as well as unsanitary trading environment were mostly blamed for the outbreak of food borne diseases such as Cholera, a situation which forced government to shut down the facility whenever there was such an outbreak in the city. This meant that food distribution, accessibility and availability was affected whenever the market was closed by government officials and this mostly affected majority of urban residents who relied on Soweto as a wholesale market for their vegetable needs through secondary traditional markets located in different parts of the city.

At the Cabbage section, which belonged to a different association from Rape and Tomatoes, it was observed that a storage shade with concrete floor was erected where Cabbages were being sold and stored at an extra storage fee of Ten Kwacha (K10.00) per day for the consignment that a farmer brought to the market. Since the shelter was the only available trading space for Cabbages, traders and farmers experienced congestion as the space was limited to accommodate the number of people for them to have a good trading environment. This mostly resulted in theft of commodities as they were interchanged as well as conflicts among farmers as they competed for limited trading spaces.

The study established that limited spaces within the shelter forced some farmers to spend a day or two in waiting before they could be allocated space to sell their commodity. This meant that some farmers were inconveniently spending longer periods of time at the market thereby incurring other expenses in addition to storage, market, and offloading fees including commissions for agents. This made farmers, especially small scale farmers to record losses as cabbage prices during this period of study were low due to high supply of the commodity on the market.

It was further established that some farmers, especially commercial farmers had permanent trading spaces allocated to them by branch officials, hence, forcing others to share the limited spaces available causing theft and mixing of some cabbage heads leading to conflicts among farmers.

Figure 4.4.2(a) below shows a picture of traders buying tomatoes from the back of unrefrigerated and non-containerised lorry parked in on open congested space at Soweto market. The trading is conducted under direct sunlight which does not only quicken the ripening process of the already ripe tomatoes but also shortens the shelf-life of the commodity, hence, forcing farmers to sell within a day

or two often at lower prices in order to avoid complete losses before the commodity goes to waste

Fig. 4.4.2(a) Shows agents selling tomatoes under direct sunlight at Soweto market. Source: Researcher 2017

Figure 4.4.2(b) below shows picture of Rape being sold on the floor of open trading spaces at Soweto market that are not secured with concrete to ensure that there is no dust during dry seasons or that the place does not become muddy during rainy season to make the trading environment conducive. The absence of concrete floors compromises safety and quality of vegetables posing a high risk of contamination. The packing method further compromises the freshness of the commodity making it wither easily during sunny and hot days.

Fig.4.4.2 (b) Shows Stacks of rape packed in grain bags being sold at Soweto market. Source: Researcher 2017

Figure 4.4.2 (c) below shows congested Soweto market where passage of goods, traders and vehicles become a problem during peak trading hours of the morning. Congestion leads to thefts among farmers and traders, including compromising safety and health of both farmers and traders. This discourages some farmers and some traders to sell or order vegetables from Soweto market, hence distorting food sourcing and distribution for the city.

Fig.4.4.2 (c) Shows traders from different parts of the city ordering tomatoes for resell in markets across the city. Source: Researcher 2017

Figure 4.4.2 (d) below shows heaps of cabbages belonging to different farmers being sold from the market shade. Lack of space brings about conflict among farmers and theft of the commodity by some agents. Additionally, the spaces are paid for on a daily basis affecting the profit margins for farmers when commodity prices are low.

Fig. 4.4.2 (d) Shows stacks of cabbages belonging to different farmers being sold at Soweto market.

Source: Researcher 2017

Despite Soweto market being the major fresh produce wholesale market for Lusaka, accessibility and the processes of vegetable procurement for market supply and distribution were a challenge among both farmers and traders. Both traders and farmers complained of the difficulties they had to endure in terms of accessibility, transportation and storage at Soweto, which increased chances of recording losses due to damages and high transportation cost.

This caused changes in the supply and distribution pattern of vegetables for the retail market as some traders opted for convenient and alternative sources such as the T4 market and other emerging markets around the city to reduce on time spent in sourcing for the commodity as well as minimise chances of losses due to damages in the transportation process and related costs.

4.4.3 Agents

From 150 farmers interviewed (Rape, Tomatoes and Cabbages), 120 farmers reported that management at Soweto market did not allow them to sell their vegetables directly to traders but

through the involvement of agents on a commission basis reported to be between 10%-20% despite the absence of laws prohibiting farmers from engaging traders directly. Despite the Bus Stations and Market Act of 2007 providing for the management of markets through market boards comprising of different stakeholders, the study showed that trading spaces for different commodities at the market were being managed by different managements who were called as branches which were headed by branch officials who were mostly ruling party officials.

The role of the Council at Soweto market in general management and infrastructure development and maintenance as well as allocation of trading spaces was conspicuously missing except for collecting market levies. The study established that branch officials managed trading places and general management of the market. Trading spaces were a source of power struggle and conflict between farmers and branch officials as the officials determined who was allowed to trade at the market. It was observed that lack of the inclusion of farmers and traders representatives in the composition of the branch led to lack of transparency and accountability in the management of the market.

The study further established that agents were employees of branch officials who sold farmers' vegetables on behalf of the branch officials, thereby, making it "illegal" for farmers to engage traders directly so that they could be paid commissions. It was further observed that agents determined prices for commodities, hence, having different prices for the same commodity depending on the perceived quality of the vegetables, relationship with the farmer and the trader as well as that day's volume of vegetables supplied to Soweto market.

Farmers who had established trust and a long term relationship, especially with senior branch officials, had their commodities sold at reasonable prices as compared to farmers who were relatively new at the market. Resulting from lack of transparency and accountability, 70 farmers out of the 150 interviewed reported recording losses due to low and fluctuating prices of the commodities coupled with market levies that they had to pay and 30 farmers indicated that packaging and perceived quality contributed to determining the price of commodities.

This research established that majority farmers were not happy engaging agents to sell their merchandises on their behalf except that they had to do it in order to be allowed access and allocated space where they could sell their commodity. Other farmers that did not want to take their vegetables to Soweto market opted to sell their products from their farm places, risking products to go to waste when there were no traders coming through to order the vegetables. The risk of wastage was also compounded by the fact that most farmers did not have storage facilities on their farms to prolong the shelf life of their vegetables as well as keep them fresh. High wastage of vegetables within farms led to reduced volumes of the products being supplied to the market, therefore, affecting food security.

Additionally, when traders travelled long distances to order vegetables direct from the farms, it meant that commodities were to be sold at higher prices to consumers in order to allow the traders recover transportation costs in addition to making profit.

The study further showed that conditions of access to the market and allocation of trading spaces affected food accessibility and distribution negatively as access to the market depended on agreeing to the conditions set by branch officials.

It was further observed that most of the branch officials did not have professional skills to manage markets without disrupting systems that enhanced food security for the city as there was no record keeping or information management systems put in place to help formulate mechanisms that would enhance food security.

Below are some excerpts from interviews conducted with farmers:

"I brought cabbages and water- melons but I am not allowed to sell my own products direct to the traders that come to order vegetables. We are forced to sell through agents or depending on the commodity you have, like onions for instance, you are forced to directly sale to the agents not even selling on your behalf to traders. So at the end of the day if you bring your onion or other products to the market it's like you produced it for agents to come and make money for themselves", (Interview with a Cabbage farmer from Chibombo district at Soweto market on 12th June, 2017)

"You see, the problem is that these agents or sellers are not regulated. There are no laws to regulate agents so they determine the price for your product. You would be surprised that products of the same quality would sale at different prices, for example tomatoes from the same field given to two different agents would be sold at maybe two hundred kwacha per box while the other one would sell it at one hundred twenty kwacha per box, therefore making you incur losses. So that's why it is important to engage agents that can sell your product at good prices not those who are just interested in getting commissions at the end of the day regardless of the loss you make. So, there is need to come up with some regulations to guide the conduct of these agents", (Interview with a tomato farmer from Chongwe district at Soweto market, 14th June, 2017)

It was observed that most farmers were not comfortable with the system of using agents as it lacked transparency owing to the fact that agents were not regulated or affiliated to any regulatory body to provide checks and balances to ensure that they were accountable in the way they set commodity prices and commission fees. Lack of transparency and accountability, on the part of the agents, caused some farmers to incur losses and as such, got discouraged to continue with vegetable cultivation.

The researcher further observed that farmers had certain preferred agents who they engaged to sell their vegetables based on the trust or mutual relationship cultivated over time t and perceived skill to sell the product at reasonable price.

It was reported that engaging agents that farmers knew very well and trusted reduced, incidences of theft as well as enabled farmers to leave the market place in order to avoid the inconveniences of congestion and unhygienic conditions at the market.

4.4.4 Alternative markets

It was observed that alternative, but not legalised vegetable markets, were being created in some parts of Lusaka district where farmers were allowed to freely engage traders directly without the involvement of agents, without paying any levies as well as sell their commodities at reasonable prices. Among the alternative markets that had emerged in Lusaka included T4 junction at the Chongwe-Lusaka boundary, situated east of Lusaka at the Kenneth Kaunda International Airport junction, as a wholesale trading point for vegetables sold in markets situated in Lusaka east especially at Chainda and Chelstone markets .

11 out of the 15 traders interviewed at Chainda market mentioned that they preferred ordering their vegetables from T4 market due to its proximity and easy accessibility as opposed to Soweto. They indicated that T4 market as an alternative to Soweto was conducive for trading and enabled them reduce transportation costs as it was near both production centres and residential areas that sourced their vegetables from the traditional market. To this effect, majority vegetable traders at Chainda market indicated ordering vegetables from the T4 market four to five times weekly.

This meant that proximity was one important factor in vegetable supply for the city as shorter distances were preferred by both traders and farmers due to reduced transportation costs which enabled both groups to trade at reasonable prices to enable the consumers afford the commodity. Alternative markets did not only provide affordable sources of vegetables, especially for people in the low income brackets, but also eased accessibility and distribution of vegetables due to the shorter distance.

The affordability and accessibility to fresh vegetable markets improved dietary diversity, nutritional requirements as well as food safety for urban residents, especially low income households or those that did not have refrigeration facilities to be able to buy fresh products on a daily basis in small and affordable quantities.

Additionally, the study showed that emerging alternative wholesale vegetable markets were being created in many areas around Lusaka especially in private premises such as church grounds and open spaces near shopping malls. It was established that alternative markets provided a platform on which farmers could directly engage traders and sell their products at reasonable prices as well as provide a platform for transparency, accountability and democratic space in which stakeholder's views or voices were considered in improving vegetable supply and distribution in the city.

In this regard, this study established that out of 25 farmers that indicated came from Makeni and Lilayi farming areas within Lusaka district, 16 mentioned that they opted to take their vegetables to Tuesday Markets held every Tuesday at Saint Peter's Anglican Church along Burma road in Lusaka's Kabwata township and Crossroads shopping mall situated in Lusaka's Woodlands residential area, Friday market held in Barlastone area situated to the west of Lusaka and Saturday market in Kabulonga at the Reformed Church premises. They indicated that they preferred these places in order to avoid congestion, agents and low commodity prices at Soweto. Nine (9) other farmers indicated that they did not mind taking their merchandise to Soweto market as they were indirectly creating jobs for the unemployed youths who were acting as agents at Soweto market.

Figure 4.4.4 (a) below shows some of the emerging markets around most townships in Lusaka to circumvent the challenges of Soweto market.

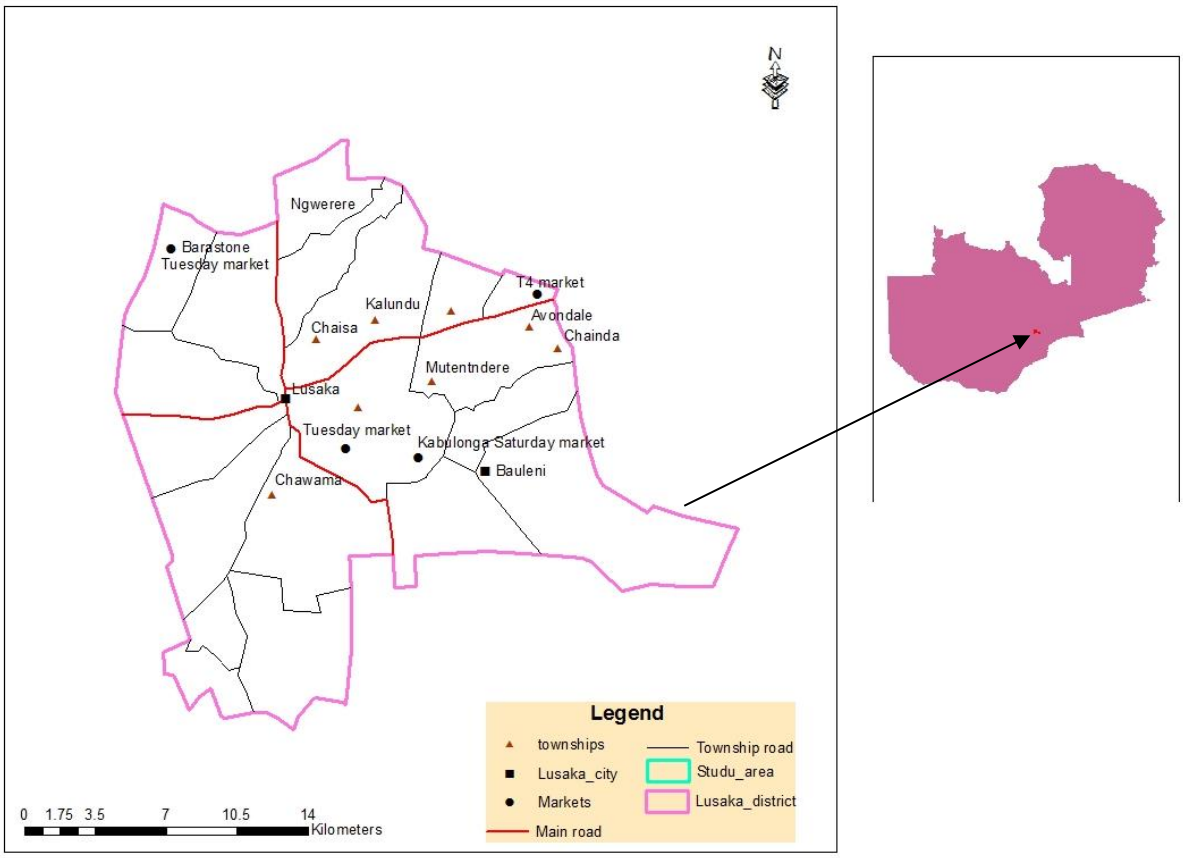

Fig. 4.4.4 (a) Shows map of emerging alternative markets in Lusaka district. Source: Researcher 2017

It was further observed that politicisation of market management and lack of proper governance structures at Soweto market was causing the emerging trend of alternative market places for vegetables, as the alternative markets were more inclusive, transparent and organised to the benefit of all stakeholders owing to the fact that they were being created in areas closer to retail markets that had a wider consumer distribution base.

4.5 Assessment of whether and why the trends of vegetable sourcing for the urban market have changed

In order to ensure food and nutrition security under a high population and rapidly urbanizing environment, cities needed to have policies and plans that would assure reliable and resilient food systems. Dubbeling and Pasquini (2010), observe that urbanisation was rapidly causing the conversion of urban agricultural land to non-food producing uses, adding that this situation was compounded by poor infrastructure, problematic hygiene conditions and lack of market information in Sub-Saharan Africa. Battersby (2011), also notes that African food systems were undergoing rapid transformation yet little attention was being given by planners to understand what these transformations meant for urban food security especially in the wake of climate change whose effects many countries were already experiencing.

Additionally, Haysom (2015), points out that in many cities of developing countries especially in Sub-Sahara, food planning was mostly handled on ad-hoc basis with little attention to urban food challenges mainly due to lack of knowledge and understanding of food systems. City or Planning authorities needed to consider the important roles that different production related challenges and environmental factors played in enhancing urban food security

To have an understanding of whether and why the trends of vegetable sourcing for the urban market in Lusaka have changed a total of 77 respondents were interviewed which included 25 farmers from within Lusaka district, 35 traders at Soweto market from different places with Lusaka district and 15 traders at Chainda market. These respondents highlighted their different experiences in vegetable sourcing and what they considered were contributing factors to their experiences. Others that were interviewed were a Senior Planner (SP) at the Lusaka City Council Planning Department and a Senior Agricultural Officer (SAO) at the District Agricultural and Cooperatives Office in charge of Lusaka district in order to validate the data which was obtained from the interviews with farmers and traders. The 75 respondents (farmers and traders), who were randomly selected for interviews had different years of trading and production experience. The findings were as follows:

4.5.1. Trends of vegetable sourcing

Interviews with majority of the traders, both at Soweto and Chainda markets, showed that vegetable sourcing trends had changed over the years as most of the areas that previously used to produce vegetables conveniently close to retail market places were no longer there, hence, forcing more traders in Lusaka to travel long distances to Soweto market as a major wholesale market for vegetable orders.

13 out of 15 traders interviewed at Chainda market indicated that they had experienced changes in the pattern of vegetable sourcing as they previously used to order vegetables from the near-by farms around Ibex Hill, but currently relied on Soweto and T4 markets for their vegetable supply while two indicated that they ordered from Ibex Hill.

At Soweto market, all the 35 traders indicated that they procured their vegetables from Soweto owing to the fact that farms were they used to procure vegetables previously were no longer active or produced less quantities to meet their needed quantities.

Below is an excerpt from the interview with one of the traders at Chainda market

"We used to order our vegetables from Ibex farms but if you go there today, you will find that they have built houses on those farms. We can't call them farms anymore, because they no longer cultivate. In fact, Lusaka is not for farming but for building houses to accommodate people. Those who have small holding farms are subdividing their farms to build houses", (Interview with tomatoes trader at Chainda market in Avondale, Lusaka, on 16th June, 2017).

The study established that 73 percent of vegetables came from outside Lusaka while 27 percent came from within Lusaka, making Lusaka to rely on regional food networks to meet its vegetable demands. These figures were arrived at after adding up all the quantities in kilograms of the selected vegetables sourced from outside Lusaka as one unit and aggregate quantities of all categories of vegetables from within Lusaka as another, then reflected in percentage form.

This meant that a lot of urban residents were vulnerable to price increases of the commodity from time to time due to transportation costs, hence, making the commodity unaffordable to poor residents, which could consequently lead to starvation or undernourishment among residents who depended on vegetables as main accompanment for their staple food.

It was established that the changing trend in vegetable sourcing made availability of the commodity difficult for traders as they had increasingly depended on Soweto market, which was struggling with storage and governance issues. Accessibility to Soweto market, at certain periods of the year, particularly rainy season was difficult for both traders and farmers, hence, further destabilizing food security and food safety for the city.

Additionally, long haul of some vegetables which came from distant places such as Mkushi district, located about 300 kilometres from Lusaka, South Africa, located about 2000 kilometres and Malawi located about 800 kilometres from Lusaka contributed to environmental problems such as air pollution.

It was further observed that vegetables from certain parts of the city particularly, Ngwerere area which is situated to the north-east of Lusaka district were being sold at lower prices as it was reported that traders were not willing to order vegetables from this area. This was due to perceived contaminated water used for vegetable growing in the area as a result of effluent discharged into Ngwerere stream, a main source of water in the area.

This meant that few farmers situated in this area and other areas within the city boundaries that were perceived to have polluted water sources were willing to engage in vegetable production as there was lack of ready market for their vegetables, hence, causing others farmers to divert to other forms of production activities other than vegetables. Environmental challenges such as pollution of water sources as indicated above means that traders were more comfortable buying vegetables that came from places that were perceived to be less or not polluted, especially places outside Lusaka city.

4.5.2 Land Conversion

Out of the 75 interviewees, 50 indicated that declining agricultural land due to land conversion to residential use was a major contributing factor to low vegetable production in Lusaka district while 15 interviewees attributed declining vegetable production, among the existing farmers, to high electricity costs for irrigation and 10 mentioned water shortages and drying up of boreholes due to declining amounts of annual rainfall as the contributing factors of low vegetable production within Lusaka district. From the majority responses, it was found that land conversion to other uses particularly to housing and other high value properties affected urban agriculture and subsequently led to declining land for vegetable production.

Furthermore, the above assertion was validated by the Senior Planner (SP) at the Lusaka City Council Planning Department, who indicated that in every one hundred applications that the local authority processed for land use change, forty (40) of them were applications to convert agricultural land to other forms of land use particularly to residential and industrial use. It was indicated that the rate of land use conversion from agriculture to other uses could be higher than the official statistics because there were some farms that had been subdivided before seeking approval from the Council.

Below is an extract from the interview conducted with the senior planner at the Lusaka City Council

"In every 100 hundred applications for land use change that we process as a planning authority, 40 of them are applications to convert agricultural land to other forms of land use particularly to residential and industrial use. So, annually the City loses about 40% of agricultural land. The figures could be higher than this because there are some farms that have been subdivided before seeking approval from the Council. As a planning authority, we have noticed that Lusaka is experiencing new trend especially when it comes to land as there is huge demand for land in the city as a result of urbanisation. There is no land to accommodate new developmental projects such as industries or houses and because of land shortage, people with parcels of land are taking advantage of that to convert agriculture land. Even backyard gardening is no longer there as much of the land within those big yards has been taken up by construction of houses within those big yards. So, definitely, urbanisation has impacted negatively on urban agriculture land" (Interview with a Senior Planner at the Lusaka City Council Planning Department, Lusaka, on 13th June, 2017).

It was further established that hectares of land, for agricultural activities, within Lusaka was dwindling faster especially under small scale farmers who were selling their parcels of land to higher bidders or subdividing it to small residential plots. This was validated by an interview with the District Agriculture Coordinating Officer who confirmed that their official annual statistics for vegetable production in the different farming zones within Lusaka showed a significant reduction.

Below is an excerpt from an interview with the Senior Agriculture Officer;

"Hectares of land under production has reduced by 50% in the last 10 years as some farms have been sold while others have been reduced in size to accommodate other categories of land use. In that regard, less than 55% of rape, onion, tomatoes and cabbage are produced within Lusaka annually as a result of limited land and high cost of production" (Interview with Senior Agriculture Officer at the District Agriculture Coordinating Office, Kwacha House, Lusaka on 17th June,2017).

Although there seemed to be a difference in figures as to the true extent of agricultural land conversion as provided by the two government officials, the difference is understood as these were two different government institutions with different methods of data collection and record keeping. The Council as a city planning authority looked at land in general including vacant public spaces where open cultivation was being done while ministry of agriculture looked at agricultural land in areas formally designated as agricultural areas. For example, the reduction of hectares of land under production by 50 percent as indicated by an agriculture official meant that Lusaka had lost about 1, 429 hectares of the 2,857 hectares of high-intense agricultural land possessed by commercial farmers.

The 50 percent agriculture land reduction trajectory meant that about 1,188 hectares of the 2,375 hectares under low-intense agricultural land possessed by small holder farmers and 2,772 hectares of 5,545 hectares which was vacant land where open space cultivation was being practiced was lost in the last 10 years.

Deducing from the two quotes above, this research established that urbanisation had negatively affected urban agricultural land due to conversions to other land uses. This finding was consistent with the MLGH, LCC & JICA Master Plan which shows that Lusaka was likely to run out of urban agricultural land by the year 2030 as shown in the proposed land use map presented in figure five below.

Declining land for agricultural activities within the city means that less vegetables were being produced within shorter distances but the city relied on regional food systems for its vegetable supply, therefore, to enhance food resilience for the city, there was need to use both local and regional food systems.

The diversified approach to the city's food sources would help mitigate any disruption or disturbances in food systems resulting from extreme weather events or wholesale price increases either at local or regional level.

Loss of agricultural land meant that the city would rely on vegetables coming from other far places, consequently leading to increased prices for the commodity due to transportation costs, environmental degradation as a result of air pollution due to long haulage, and increased chances of commodity damages because of a bad road network.

Furthermore, high electricity costs would hinder some local farmers especially small scale farmers to produce vegetables for market supply as a way of avoiding losses but instead divert to production of other food stuff that would be economically profitable, therefore, the lesser the city produced its vegetables, the more food insecure it would become as it is not in control of production.

The study showed that urban agriculture was not emphasised or planned for by city planning authorities as there was absence of policy or mechanisms aimed at preserving existing urban agricultural land, instead, it was observed that there was a trend by land owners, especially small scale farmers to apply for land use change and in some cases, farm land was being converted before they could apply for land use change at the planning department of the Council.

As shown in figure five below, the proposed land use map for Lusaka district, there is no planning for agricultural activities within the city but that such activities will be taking place from neighbouring rural towns. MLGH, LCC & JICA (2009) City Master Plan, states that by the year 2030, Lusaka would run out of agricultural land especially that held by small scale farmers while that held by commercial farmers would be reduced by more than half. This means that surrounding rural towns such as Chongwe, Chibombo, Chisamba and Mwembeshi ,among others, will increasingly become important vegetable sources for Lusaka provided that infrastructure that promotes regional food network was put in place to enhance food security for the city.

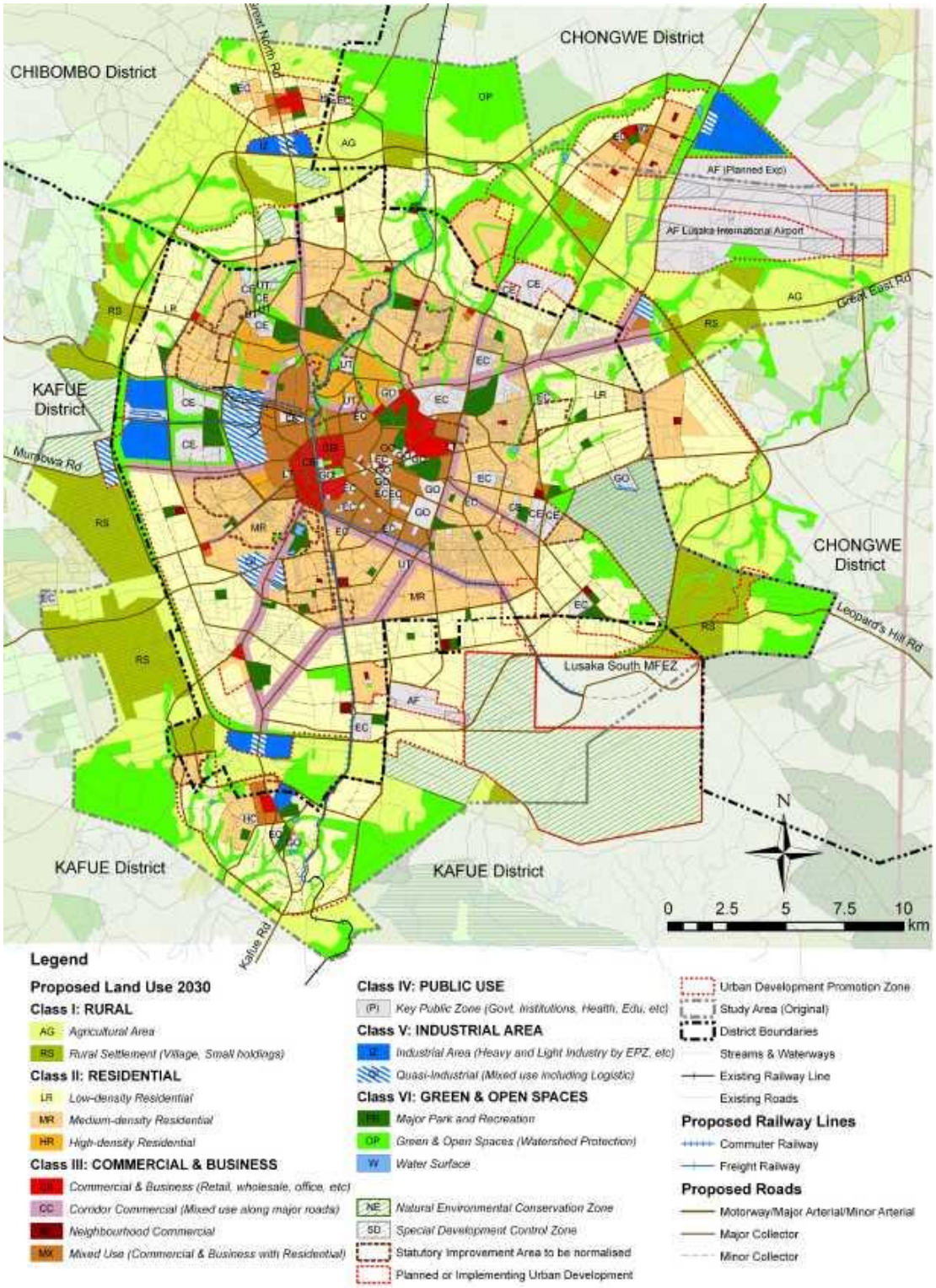

Fig 5 Shows Proposed Land use map for Lusaka district by 2030. Source: MLGH, LCC & JICA (2009)

Resulting from urbanisation and conversion of agricultural land to other land uses, vegetable sourcing trends for Lusaka district are expected to significantly continue changing as most traders will rely on Soweto market as the biggest fresh produce wholesale market, however, there is need to improve infrastructure and governance system at Soweto market in order to enhance food security for the city.

Conclusion

In this chapter, the research revealed that 73 percent of vegetables (Rape, Onions, Tomatoes and Cabbages) came from outside Lusaka while 27 percent came from within Lusaka, making Lusaka to rely on regional food networks to meet its vegetable demands. Despite Lusaka relying heavily on regional food networks, the city did not have meaningful infrastructure at its largest fresh produce market (Soweto) to enhance food security through adequate storage facilities as well as ensuring food safety and nutrition.

The study further discovered that the City was losing 40 percent annually of its urban agricultural land to other land uses such as housing, industry and other high value commercial developments as a result of urbanisation which was growing faster. Additionally, it was discovered that urban agriculture was not emphasised or planned for in the City's Master Plan hence, the absence of policy or mechanisms to preserve existing urban agricultural land as a way of promoting urban food security.

Poor governance challenges at Soweto market such as lack of accountability, transparency and limited trading spaces were also contributing factors to food insecurity in the city as they affected accessibility, availability and distribution processes of vegetables for urban consumers who relied on the traditional market systems for their vegetable supplies.

This was because the fact that some farmers and traders failed to take their commodity or order vegetables from there due to safety and hygiene concerns coupled with high possibilities of losses especially by farmers as a result of many expenses and the obscure manner in which agents conducted their business.

5.0 Discussion

5.1 Introduction

This discussion chapter provides explanations of the major findings of this research presented in the previous chapter (chapter 4). It further attempts to link literature review to the research outcome as well as provide linkages and departure points of research done by other researchers.

The chapter highlights, in summary, the statement of the problem, key research questions and a detailed discussion of the findings and what they mean to the general research objective and food security in Lusaka district.

A conclusions is subsequently written further highlighting possible future research taking into account what the research revealed and limitations encountered during the period of research.

Various studies (FAO, 2016, Agyemang et al, 1997, Lubinda, 2000; Hampwaye et.al, 2013) conducted in Lusaka focused on urban agriculture as a source of income and the environmental impact of such an activity while Hichaambwa (2012), looked at physical market structure and processes for selected fresh produce sales at Soweto market. No research has been conducted to ascertain the impact of urbanisation on urban agricultural land particularly the production and supply of vegetables for the traditional markets within Lusaka district, in respect of urban food security considering that the city has been experiencing population growth for a long period of time.

An understanding of the extent to which urbanisation has affected the production and supply of vegetables in Lusaka is important as it will provide insight into identifying sources of vegetables for the traditional markets in Lusaka, understanding the accessibility and processes of vegetable procurement for market supply as well as provide an understanding on whether and why the trends of vegetable sourcing for the urban traditional markets have changed.

This is important in that it will help to put mechanisms in place that will help to build a food resilient city in the face of an increased population and extreme weather events and other unforeseen situations that have the potential of disrupting food system in the city.

5.2 Land use conversion

This research established that Lusaka city, like other cities in Africa and Asia (Chirisa, 2010; Naab, 2013; Essougong, 2017, Sabiiti and Katongole, 2016; Rimal, 2013) was losing its urban agriculture land to other land uses such as commercial, industrial and residential. It was established that the city was losing about 40 percent of its available agricultural land annually as population increase over the years has exerted pressure on existing farm land and open public spaces that were being converted.

The research shows that the more the city population was increasing and urbanising, the less productive it was becoming in terms of vegetable cultivation as agricultural land was being lost to construction of houses in order to meet accommodation demands, just like cities such as Kampala, Yaoundé, Pokhara, and Havana (Naab, 2013; Essougong, 2017, Sabiiti and Katongole, 2016; Rimal, 2013; Premat, 2009) among others.

Despite official statistics showing that Lusaka was converting its urban agricultural land at a rate of 40 percent annually, indications are that figures could be higher due to the fact that it was common practice among land owners to convert their land use or subdivide it prior to seeking authorisation from the City council.

This finding is consistent with studies by (Montgomery, 2008; United Nations, 2012) that show that Africa, as a whole was, experiencing urban growth particularly Sub-Saharan Africa which had an urban growth rate of 36.7 percent. The increases in urban population has brought with it challenges that have threatened the sustainability of urban agriculture as land use conversation is now the most preferred to build houses and other high value properties.

Lack of planning for urban agricultural land as highlighted in the City Master plan (MLGH,LCC & JICA, 2009) or lack of its emphasis thereof, might lead to loss of planning for agricultural land within the city as urban agriculture might not get much attention.

5.3 Urban agriculture

The neglect of urban agriculture in preference to other forms of land use gives further credence to (Ellis and Sumberg ,1998; Zezza and Tascioti,2010) claims that the importance of urban agriculture in contributing to urban food security, livelihoods and poverty alleviation was exaggerated especially in developing countries owing to lack of reliable data by planning or local authorities

Contrary to arguments (Ellis and Sumberg, 1998; Zezza and Tascioti, 2010) that urban agriculture was responsible for high energy and water consumption through irrigation, this research revealed that it was in fact high electricity cost and low water levels that were also contributing factors to reduced production of vegetables among small scale farmers from within Lusaka.

The affordability and accessibility to fresh vegetable markets improves dietary diversity, nutritional requirements as well as food safety for urban residents, especially those that did not have refrigeration facilities to be able to buy fresh products on a daily basis in small affordable quantities.

As noted by (Egziabher, 2013; Orsini et.al, 2013), urban agriculture has been key in cities such as Addis-Ababa and Yaoundé as it provided opportunities for improved food supply and a cheaper source of vegetables due to the fact that production was done close to urban markets and consumers. In that regard, this research showed that vegetable traders within Lusaka used to procure their vegetables from near-by places that used to cultivate vegetables. The research showed that continued reduction of urban cultivation has changed sources and processes of vegetable procurement for market supply from local to distant places, hence, causing a price increase for some commodities as shown in subsection 4.4 of chapter 4.

By putting up shorter and well-coordinated efficient urban food chains, it is assumed that affordable and safe vegetables would be made readily available to urban population as well as lead to decreased food loses, waste, and also decreased environmental impact caused by long haul transportation (Foster et.al, 2015).

When it comes to planning for urban agriculture as a mechanism for promoting urban food security, this study showed that city planning did not consider urban agriculture as an important aspect of urban food security as its absence was unavailable in major documents such as the City Master Plan showing both current and proposed land use maps by 2030 respectively as indicated in figure 5 in chapter 4.

Despite tolerance from the City Council for urban agricultural activities (Hampwaye, 2007), there is absence of a clear policy and planning for the incorporation of urban agriculture, instead, the city was losing an average of 40 percent annually of the available agriculture land to other land uses as shown in subsection 4.5.2 in chapter four from interview excerpts with the Senior Planner at the Lusaka City Council and Senior Agriculture Officer at the District Agriculture Coordinating Office.

This finding was consistent with MLGH, LCC & JICA (2009), which states that agricultural land possessed by small scale farmers estimated to be 2,375 hectares and 5,545 hectares of vacant land, were open space cultivation was being practiced, would be reduced to zero while 2,857 hectares possessed by commercial farmers would be reduced to half by the year 2030 as shown in figure 5 in chapter 4.

5.4 Urban food security

With the dynamics of increasing population and decreased land for urban agriculture, urban consumers were becoming less food secure as most of the vegetables were now being sourced from distant places for supply and distribution by vegetable traders. This compromised on the nutritional quality and freshness of the vegetables in traditional markets such as retail outlets due to the fact that they lacked infrastructure such as refrigeration facilities and good road network from rural production centres to quicken transportation time. Soweto market, as a major wholesale market in the city, also lacked refrigeration facilities to keep vegetables fresh and prolong their shelf-life.

Lack of adequate transportation and refrigeration infrastructure did not only compromise food security but quality and food safety too, hence, posing a risk of undernourishment or contamination for urban consumers.

The study also established that environmental challenges, particularly pollution of surface water sources contributed to declining volumes of vegetables being produced from some parts of Lusaka as some farmers opted to venture into other production areas other than vegetable cultivation, therefore, contributing to changing trends of vegetable procurement and supply for the city.

Majority of urban consumers were also vulnerable to price increases of vegetables during certain seasons of the year particularly rainy season as there was reduced supply of commodities because some farmers, especially from rural towns, stopped producing vegetables as they concentrated on growing other crops such as Maize that would be harvested after the rainy season since during this season roads become impassable and transporters were not willing to ferry commodities from rural areas as they would not want to damage their vehicles.

Commodities such as rape and tomatoes that are mainly sourced from outside Lusaka as shown in table 2 and table 3 respectively in Chapter 4 normally have their wholesale prices pushed up by double or three times higher than the prices during dry season as they are in short supply due to transportation challenges.

When it came to Onions, the situation of high prices during rainy season was the same as the commodity was coming from far places such as South Africa and Malawi, hence, increasing transportation costs which were eventually passed on to consumers.

Contrary to the findings of City Region Food System Situation Analysis of Lusaka (FAO, 216) that there is a local food system feeding the city as there are farms or peri-urban agricultural activities within Lusaka city, this study found that the city depended on regional food networks for its vegetable supply as local food systems were getting distorted because most of the places that previously used to cultivate vegetables were no longer productive.

The study further demonstrated that environmental factors such as dwindling water resources attributed to climate change and economic factors such as high electricity costs were contributing to transforming food systems within Lusaka city, yet little attention was being given by planners to understand what these transformations meant for urban food security especially in the wake of climate change whose effects many countries were already experiencing as argued by Battersby (2011).

It is, therefore, important that city planners come up with infrastructure that would enable farmers store their commodity in market places to prolong shelf-life. Road network from production centres need to be improved upon to maintain steady supply of vegetables to the market regardless of the season, as this would help in maintaining low prices, accessibility and availability of the commodity.

5.5 Food governance

For food security to be sustained, there is need for city authorities to understand the food governance system, distribution, retailing, safety of vegetables at both Soweto and retail markets as these aspects are cardinal to urban food security. However, it was established that food governance systems, currently at play, were problematic and could not help to improve food security in the city because there was lack of properly identified roles and linkages between the City Council and branch officials that were in charge of market management.

The local authority seemed to be under resourced both in terms of human and financial resources to effectively monitor and evaluate how market governance systems were hindering food security and how such hindrances could be improved upon to ensure that there was effective supply and distribution mechanisms of vegetables to urban.

Poor governance systems at Soweto market impacted negatively on food security as the process of space allocation lacked accountability, transparency and inclusiveness, therefore restricting accessibility, availability and distribution processes of vegetables for majority urban consumers who relied on the traditional market systems for their vegetable supplies.

The market was run on ad-hoc basis mostly by party officials as well as agents who did not have formal training or affiliated to a professional body to regulate their conduct in order to promote trust and mutual relationship with farmers but instead, engaged in practices that discouraged farmers from appreciating the benefits of using agents in food governance. For example, it was discovered that agents were over charging commission fees as well as selling commodities at reduced prices at times, which caused farmers to incur losses and possibly not engage in vegetable production anymore. Little attention to urban food challenges mainly due to lack of knowledge and understanding of food

systems by the City Council was also negating urban food security as there was little room for alternative voices from civil society and the private sector to help policy makers make informed decisions that would promote urban food security.

Haysom (2015) states that food governance in many urbanising cities of developing countries remain hierarchical and have difficulties incorporating availability, utilisation, stability and access as key pillars of food security. Dubbeling and Pasquini (2010) add that urban food security will remain problematic in many African cities as a result of reduced productivity due to climate change effects and rapid urbanisation.

The study established that Lusaka city had inefficient food delivery system due to its systems that were rooted in traditional governance structures of hierarchy, coupled by the absence of modern policies and systems to promote a food resilient and food secure city through an efficient regional food network systems, as the city was reliant on regional sources for its vegetable supplies.

The findings of this study were consistent with Kearns and Padidson (2000) and Haysom (2015) who observed that cities rooted in the top to bottom governance structures of hierarchy have proved to have problematic delivery mechanisms as they were not inclusive and tolerant to alternative voices, Lusaka was not an exception.

It was further established that food governance was mostly handled on ad-hoc basis by the local authority as there was lack of a discernible policy to promote urban food security due to lack of knowledge and understanding of food systems challenges. The local authority lacked mechanisms to provide adequate resources and infrastructure to effectively handle urban food security.

This finding showed that urban food security or governance was not considered as being among priority areas by the planning authorities in Lusaka district just as Haysom (2015), noted that many developing countries in Africa did not have food policies specifically looking at enhancing food security in urban areas.

5.6 Emerging trend for alternative markets

Figure 4.4.4 (a) in Chapter four shows that there is an emerging trend for alternative fresh produce markets or trading spaces in many parts of the city such as T4 junction market located east of Lusaka, and also farmers market days which are held on Tuesdays, Friday's and Saturday's parallel to the established traditional markets. These alternative markets are mostly emerging in areas that are near medium and densely populated residential areas such as Libala South east of Lusaka, Chelstone, located to the east, and Matero, located to the north of Lusaka just to mention a few.

The majority of traders interviewed at Chainda market, as shown in subsection 4.4.4 in Chapter four, mentioned that they preferred ordering their vegetables from T4 market due to its proximity and easy accessibility as opposed to Soweto. The testimonies show that shorter and localised food systems were one important factor in vegetable supply for the city, as they reduced transportation costs, eased accessibility and distribution processes as they reduce the number of stages.

This finding was consistent with studies by (Wegerif, 2014; Pinter et.al.201) who demonstrated in the study of sustainable food chains and vegetable production and supply for selected urban cities in Africa and Europe that included Nairobi, Kenya, Dar-es-salaam, Tanzania and Crystal Palace in London

among others, that food chains that were considered sustainable are those that were shorter and had less actors in the production-supply chain as they did not only make vegetables cheap, but were also associated with quality fresh produce, food safety and food security.

As indicated by majority traders at Chainda market, T4 market, as an alternative market to Soweto provided a platform for making vegetables affordable due to shorter distances covered during transportation, distribution and retailing chain for the benefit of both traders and urban consumers, especially low income households as they would be able to afford both to buy fresh and affordable vegetables.

Despite not being gazetted by local authority, alternative markets shown in figure 4.4.4 (a) in Chapter four, have emerged because they have provided an avenue for interactive relationship among different stakeholders which seems to enable them articulate their interests as well as enable them make decisions freely. The democratic, inclusive and transparent governance systems that seem to exist in alternative markets would help improve urban food security, safety and nutrition as well as shorten food chain processes that would eventually make vegetables accessible and affordable including sufficient utilisation of the commodity.

If sustained and well-managed, alternative markets would further improve availability of commodities as farmers are given autonomy to engage traders without the involvement of agents as well as allow for the establishment of many and diversified points of sell for the convenience of farmers, traders and consumers.

This shows that the more the city's population increases and new residential areas being created, the more the demand for various points for wholesale markets and diversified sources for vegetables, hence the need by the City authorities to adequately understand how the changing vegetable sourcing pattern were affecting food security in the city and how these dynamics were likely to affect urban consumers in future.

Furthermore, uncoordinated trading activities at Soweto market and the growing number of alternative markets could further obscure prioritising planning for urban food security as there was no distinct data bank or mechanism of capturing data by the authorities to ascertain quantities of vegetables produced and consumed in the city as a basis of policy formulation to easy accessibility, affordability, and availability of vegetable supply for improved nutrition and food security.

5.7 Food sheds

This study established, as shown in figure two in chapter four, that the majority of the vegetables came from distant rural areas while the city's contribution of the selected vegetable volumes was small. It was established from interviews conducted with Senior Agriculture Officer and several traders both at Soweto and Chainda market as reflected in interview excerpts reflected in Chapter four, that local production of vegetables had reduced over time due to urbanisation, as such traders, particularly those that had been trading for a longer period of time had seen changes in vegetable sourcing from local and nearby sources to various distant places.

Like (Mukui, 2012; Gunasekera 2012) showed that some urbanising cities in developing countries were experiencing shifts in vegetable sourcing, this study showed that Lusaka had increasingly come to rely

on Soweto market as a point of convergence for regional food network because it was a place where majority producers from outside Lusaka took their fresh produce for wholesale.

In the context of Lusaka, reliance on regional food network system would entail decreased urban food security as people are not directly connected to nearby vegetable sources to make them easily available and affordable due to transportation, supplying and distribution challenges as well as post-harvest losses resulting from poor packaging and inadequate infrastructure.

Despite the city relying on regional network for its vegetable supplies, it lacked dependable infrastructure, as shown in subsection 4.2.2 in chapter four, such as storage and refrigeration facilities to strengthen urban food supply and as well as support regional food sheds, to help prolong shelf-life of vegetables, ensure that food safety standards were not compromised, and subsequently, enhance food security.

Lack of infrastructure to effectively handle urban food security and food safety in the face of increasing population and environmental challenges renders the city vulnerable to food disruptions because it lacks resilient strategies to withstand disturbances that might arise more so that its vegetables come from other distant geographical locations.

Further, (Dubbeling and Pasquini, 2010; UN-FAO, 2010; Argenti and Marocchino, 2005 Rocha and Lessa, 2009; Libman et.al, 2015; Crush and Frayne, 2010) state that lack of reliable food infrastructure such as transport and markets to keep cities supplied with perishable and fresh produce was contributing to urban food insecurity in many cities of developing countries and unsafe foods which caused public health risks. In this regard, this study shows that Lusaka might not be an exception. For example, when Cholera broke out in Lusaka in October 2017, government through a multi-sectoral team comprising of Ministry of Health, Local government and other line departments on 29th December, 2017 announced a ban on the sale of vegetables at Soweto market including the ban of vegetables coming from outside Lusaka in different markets across the city as a measure to contain the spread of Cholera.

This measure did not only disrupt food systems and limit access to vegetables but caused some discomfort among different stakeholders who included farmers, traders, city residents, and economic experts citing the disruptive nature in terms of food security as well as economic effects (www.xinhuanet.com/english 6th January, 2018), which eventually resulted in social unrest in some parts of Lusaka urging government to lift the restrictive measures put in place (www.aljazeera.com/news 13th January,2018).

Contrary to Born and Purcell (2006) who argued that localised food systems were resistant or reactionary to what was considered as capitalist food production systems, through regional and global food systems, this study established that localised alternative markets such as T4 and others that have recently come up, as shown in figure 4.4.4 (a), were preferred avenue for affordable and quality fresh vegetables due to shorter distances covered during transportation, distribution and retailing processes.

Therefore, there is need for a better and more attentive governance system by the local authority (LCC) to strengthen urban food supply and distribution especially that there is evidence of vegetables

coming from distant places outside Lusaka, as shown by figure one and three, including excerpts of interviews with traders and agriculture officer in chapter four.

Conclusion

In conclusion, this research showed that like other urbanising cities in Africa and Sub-Sahara in particular, Lusaka's urban agricultural land was being lost to other forms of land uses such as housing, commercial and industrial purposes and there is no mechanism or policy put in place to preserve the remaining parcels of land as a means of promoting urban food security.

Due to dwindling urban agricultural activities in the city, Lusaka has been relying mostly on regional food networks especially from surrounding rural towns to supply its vegetable needs, however, the city lacks critical infrastructure such as storage facilities at its biggest wholesale market (Soweto) as well as a reliable transportation system to make supply and distribution of vegetables efficient.

Generally, vegetable sourcing and supply patterns have been changing over the years from previous nearby production points to other distant towns due to less production of the commodity from previous production farms and empty spaces that have now been converted to other forms of land use. Vegetable sourcing patterns have changed further due to increasing demand for vegetables as the city population was growing and this has contributed to diversified sources of various types of vegetables.

Lusaka's food security and food resilience was vulnerable and susceptible to even minimal disruptions in the supply and distribution processes. This is because there was a lack of adequate infrastructure to promote regional food network upon which the city was reliant on for its supplies. Consequently, urban consumer's, especially low income households, were negatively affected by price fluctuations during certain seasons of the year, particularly rainy season, when the supply of the selected vegetables was low.

Additionally, inefficiencies in market governance and political interference hinder food security for the city due to some restrictions which negatively affected accessibility, availability and affordability of vegetables for the majority urban consumers who depended on traditional markets for their vegetable needs. To improve urban food security, a professional and trained workforce needed to be put in place to manage and govern food systems in the city as well as put measures in place that would lessen political interference in the management of markets to improve delivery processes.

With the changing patterns in vegetable sourcing and the city producing less of its vegetable requirement, planning authorities need to raise the importance of urban food security to ensure that the city was ready to handle its growing population as well as ensure that it was being supplied with quality, safe, and fresh produce for the benefit of urban consumers.

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APPENDICES

Appendix 1

UNIVERSITY OF CAPE TOWN

Faculty of Science
University of Cape Town
Rondebosch
SOUTH AFRICA 7701

Tel: + 27 21 650-5551
Email: timm.hoffman@uct.ac.za

John Nyawali, Jane Battersby **1 September 2017**
Department of Environmental and Geographical Sciences

Dear John and Jane

RE: Impact of urbanisation on vegetable cultivation and supply for the traditional markets in Zambia. A case study of selected markets in Lusaka District

I am pleased to inform you that the Faculty of Science Research Ethics Committee has approved the above-named application for research ethics clearance, subject to the conditions listed below.

- Implement the measures described in your application to ensure that the process of your research is ethically sound; and
- Uphold ethical principles throughout all stages of the research, responding appropriately to unanticipated issues: please contact me if you need advice on ethical issues that arise.

Your approval code is: **FSREC 62 – 2017**

I wish you success in your research.

Yours sincerely

Prof Timm Hoffman
Chair: Faculty of Science Research Ethics Committee

Appendix 2.

Interview guide for Lusaka City Council

1. What extent has urbanisation caused agricultural land conversion?
2. What is the annual rate of urban and peri-urban agriculture land use conversion in Lusaka?
3. What has been the source of vegetables for Lusaka district?
4. What has been the impact of urbanisation on vegetable cultivation for Lusaka district?
5. What are other contributing factors influencing vegetable cultivation within Lusaka?
6. What has been the significance of urban and peri- urban agriculture in Lusaka?
7. What is the major hindrance to the practice of vegetable cultivation in Lusaka?
8. Which parts of Lusaka were designated for urban and peri-urban agriculture?
9. Does the Lusaka City Master plan include urban and peri-urban agriculture? If yes, which areas or if no, why?
10. What is the current status of urban and peri-urban agriculture in Lusaka district?

Appendix 3.

Interview guide for District Agriculture Coordinating Office (DACO)

1. What has been the source of vegetables for Lusaka district?

2. What percentage of each category of the selected vegetables are produced within Lusaka district?

3. Are there changes in terms of sources of the selected vegetables for Lusaka?

4. What has been the impact of urbanisation on vegetable cultivation in Lusaka district?

5. What is or are the major hindrances to the practice of vegetable cultivation in Lusaka?

Appendix 4.

Interview guide for Farmers/Traders

1. What are you selling
2. What is the quantity of the vegetables you have brought?
3. How many times do you come to the market in a week or month?
4. Do you use your own transport or hired transport?
5. Do you grow your own vegetables?
6. How long have you been growing/selling vegetables?
7. Have you noticed any changes in terms of sources of vegetables for Lusaka?
8. What do you think influences/hinders vegetable cultivation within Lusaka?
9. Where do you normally sell/order your vegetables from?
10. Is Lusaka producing enough of vegetables?
11. What are the major challenges you face as farmers/traders?
12. What are the challenges of vegetable cultivation within/outside Lusaka?
13. How does distance affect you as a farmer/trader?
14. What do you think could be done better to improve vegetable supply and distribution in Lusaka?
15. What experiences do you normally face when accessing the market?